GAS JOURNAL

LIGHT ⁘ HEAT ⁘ POWER ⁘ BYE-PRODUCTS

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Editorial Notes.

Carbonization Conference.

Special Issue of the "Journal."

On behalf of the organizers of the Carbonization Conference to be held, from Feb. 21 to 24—during the British Industries Fair—at Birmingham, arrangements have been made for the "JOURNAL" to publish, *in extenso*, in a special issue, all the original papers (with illustrations) which will be presented on the occasion. This will be the only form in which the contributions will be available prior to, or during, the conference.

The pages of this special issue will be the same size as those of the "JOURNAL;" but the columns will be set in somewhat narrower measure, so as to allow room for marginal notes. Certain papers will also be brought under consideration which have already been published. These will not be republished, but reference will be made to sources where they can be found.

Orders for copies of the Carbonization Conference Number—at 2s. 6d. each—should be sent early by all who are not subscribers to the "JOURNAL," in order to ensure obtaining copies, and to serve as a guide to the Publishers as to the number it will be necessary to print. Every subscriber to the "JOURNAL" will receive one copy free; but any extra copies desired by them must be paid for at the published price.

The date of publication of the special number will be Feb. 14—sooner, if the authors of the papers will enable it to be done by sending their MS. and illustrations promptly to the Hon. Secretary, Joint Fuel Committee, Allington House, Victoria Street, London, S.W. 1.

The conference will be a highly important one. It is being organized by the Joint Fuel Committee of the Society of Chemical Industry, the Institution of Gas Engineers, the Coke-Oven Managers' Association, and the Institute of Fuel. There is bound to be a large attendance of gas, coke-oven, and low-temperature engineers and chemists, for the programme shows that there will be plenty of interesting topic for debate—covering processes (high and low temperature) for the manufacture of gas, coke, and other products by coal carbonization. Tickets and programmes can be obtained on application to the Hon. Secretary, at the address mentioned above.

The authors of the papers are urged to do their part to assist the Joint Committee in their preparatory work by forwarding with as little delay as possible their contributions for printing. A *précis* only of the papers will be read at the meeting; hence the greater need for the full contributions being available, so as to receive preliminary publication, and thorough discussion.

Coke-Oven Gas and Direct Industrial Business.

The aspirations of our coke-oven friends are growing. Not content with entering into competition with gas undertakings in the domestic coke market, they are more or less gravely considering how they can escape from being tied down to supplying gas only to its legitimate and authorized distributors, and themselves entering into business as suppliers of gas to industrial concerns—so obtaining for this purpose a direct revenue without an intermediary gas undertaking. That is all very well from their point of view, but not from that of the gas industry, the capital in which has been invested on the strength of the powers bestowed by Parliament. Bye-product coking plants are no new thing; and gas has been made by them from their advent. But it is only now, after years of working, that the coke-oven industry is anxious not only to provide gas in bulk for the gas industry, but to indulge in gas business on their own account with manufacturing concerns. On the other hand, the gas industry empowered by Parliament, but working under severe restrictions which did not give it the desirable latitude, has, so far as it was able in such circumstances, been cultivating industrial business, and has been exploiting and improving gas apparatus for manufacturing purposes. Now it is approaching Parliament to obtain powers which, it is hoped, will give it opportunities for enlarged service, and will carry the mains of the most efficient concerns into the outer areas. Everything is being done to give cheaper gas greater availability; and to cut-out any part of the potential industrial load would be doing the industry a grievous injury. Apart from any breach of faith on the part of Parliament with the industry that has developed gas supply in this country, it would be totally unfair for Parliament to overthrow those powers, and to give to the coke-oven owners the right to ride on the back of what the gas industry has already accomplished into possession of a business which legally and morally belongs to it.

There were several references to this matter at the December meeting of the Midland Section of the Coke-Oven Managers' Association at Sheffield, when Mr. Frederick White contributed a paper which described some of the developments which have taken place in the transmission of coke-oven gas for urban and other applications in Belgium and Germany. Instances were provided by what is being done by the Ostend Light and Power Company, who not only supply coke-oven gas in bulk for Ostend, but send supplies 45 miles away to gas undertakings in Western Flanders. In addition, some of the gas is sold for steam-raising purposes, and a quantity is supplied to the synthetic ammonia plant of the Semet-Solway and Piette Company. The gas is sold to Ostend at 3d. per therm, and to undertakings in Western Flanders at 2·2d. per therm. The wonderful "grid" gas scheme of the Ruhr coke-oven owners is still in embryo; but coke-oven gas is in Germany already being transmitted a distance of 60 miles for town purposes. These are some of the things that struck the mem-

bers of the Association on their Continental tour last year; and they have evidently given birth among them to new ideas. The sympathies of Mr. C. P. Finn have been—shall we say?—suddenly aroused for the industries in certain districts which are longing for a cheap supply of gas. His impression is that the coke-ovens could supply the need. So, it is hoped, will the gas undertakings when they get more relief from statutory bondage. He also finds that the legislative powers already possessed by gas undertakings are obstacles to the trading liberty of the coke ovens; and this is described as a "hardship," because they cannot develop a supply of gas for industrial purposes. It would be a greater hardship on gas undertakings, after cultivating an industrial field, within the limits of their parliamentary sanctions, if somebody else came in and reaped the fruit. Moreover, we hope Mr. Finn does not think, when he talks of dear prices for town gas for industrial uses, that the ordinary prices are charged. They are not; and if he will study the industrial charges (say) at Sheffield and Birmingham, he will find some enlightenment.

From other remarks, we understand that colliery and coke-oven owners have their eyes on the proposed revision of the general statutory powers of the gas industry; and more than one speaker expressed the hope that legislation will be introduced to deal with the situation in respect of direct coke-oven gas supply to industries. They may without hesitation accept the statement that any such movement (other than in a district not within an area of gas supply) would be strongly resisted by the gas industry. The new aspiration suggests that what the coke-oven managers have in view is the realizing from direct business with manufacturing industries something more than is obtained for gas supplied to gas undertakings; otherwise, there would be no particular object in the direct trading as against doing the business through a bulk-purchasing gas undertaking. Therefore, a gas undertaking could supply, with relief from existing limitations, at about the same price as the coke-oven owners—thus creating no fresh complication in gas supply. Certain it is, if the coke-oven interests ever seek powers in this direction, gas undertakings will put up a powerful defence of their established interests, at the foundation of which is the authorization conferred by Parliament.

Gas Finance in Coal Strike Years.

THE Board of Trade have issued Part II. of the returns relating to authorized gas undertakings for 1926. It deals with finance and prices. The year having borne a general strike and the longest coal stoppage on record, there is more than ordinary interest in examining the figures from the standpoint of effects on the aggregate revenue and expenditure. The serviceable table which prefaces the year's details, and which gives a view of totals from 1920 to 1926, and separately for companies and local authorities, enables this to be done.

The higher prices charged for gas in the latter part of 1926, together with the ascent of market values for coke and tar, and the additional demand for gas, all contributed to swell the revenue, while imported coal had the same influence upon expenditure. The aggregate of the receipts of statutory companies (numbering 463) was £48,972,181, which was £5,040,462 more than the income for 1925. The expenditure of the companies was £43,811,615, which overlapped that of 1925 by £5,713,130. Thus the additional expenditure was more than the gain in revenue by £672,668, which is the sum by which the gross profit (£5,160,566) was reduced below that of 1925. In the case of the local authority concerns (numbering 319), the revenue amounted to £25,729,687, or £3,618,763 more than in the preceding year; while the expenditure, being £23,161,132, exceeded that of 1925 by £4,350,969. The increased outlay therefore surpassed the extra income by £732,206, and left a gross profit of £2,568,555, which was short by £641,974 of the sum required to meet interest, repayment of loans, and sinking funds—viz., £3,210,529; whereas in 1925 the local authorities had, after meeting all obligations, a balance to the good of £246,852. The figures show a better position than might have been anticipated, taking the statutory gas industry as a whole. But it must be always be remembered that aggregate figures are built-up of all sorts and conditions of results, and so hide the individual ones, which range, having regard to the circumstances, from good to bad.

The foregoing compares the total figures of 1926 with those of the (as things go now) normal year of 1925; but let us see how the figures of the seven months' coal stoppage year contrast with those of 1921, when a three months' coal stoppage occurred. Without reflection, it would hardly be credited that, although the coal strike in 1921 did not last half as long as that in 1926, the aggregate receipts and expenditure of the statutory gas undertakings were greater than in 1926. But in 1921 raw materials for gas making (apart from imported coal) were costing more than did those used in the first part of 1926 and the two to four months' coal supplies which were then put into stock in preparation for the threatened stoppage. The lessons of 1921 were not lost upon the gas industry and the country in 1926. However, in 1921, the revenue of the statutory companies totalled £51,870,058, as against £48,972,181 in 1926—thus, although the volume of business was smaller in 1921 than in 1926, the income of the companies was £2,897,877 more. But their expenditure that year reached £47,588,176, compared with £43,811,615, or £3,776,561 more. The local authorities in this 1921 and 1926 comparison show much the same thing, with the exception that their expenditure in 1921 was considerably greater than it was in 1926. The aggregate of their receipts in 1921 was £26,569,144, as compared with £25,729,687 in 1926—£839,457 more. Their expenditure in 1921 totalled £25,061,731, as against £23,161,132 in 1926, or no less than £1,900,599 more. The deficit on the local authorities' working in 1921 was therefore £1,102,815, as compared with £641,974 in 1926.

The financial outcome of 1926, both for companies and local authorities, was distinctly better than that of 1921, notwithstanding the greater length of the coal stoppage of 1926.

The Cause of Industrial Unity.

GENERALLY speaking, the attitude of the two human elements in industry one towards the other has not been all that could be desired. There has been too much evidence of the spirit of antagonism, instead of mutual trust, frankness, consideration, and collaboration. Trust can only come by knowledge, and knowledge only by frankness, consideration, and collaboration. There is no need to exonerate the employers from participation in, any more than to charge the trade unions, by whom labour is represented, with, the state of affairs which has existed. There have been shortcomings of greater or less degree on both sides; and now there is open admission that past attitude and methods have been gruesome failures. Even the militant methods of organized labour, which some in its midst would like to see intensified for the purpose of producing social chaos and revolution, have become effete and ineffective. This was more than amply demonstrated in 1926. We have come to the end of things as represented by the old ways; and everybody—other than those of the extreme school of thought in the ranks of organized labour—realize that a new order of industrial procedure is imperative if industry, the country, and the workers are to be prosperous. Employment can only be maintained at high-water mark by the standards of industry—technical and commercial—being kept at the highest possible level. Antagonism of the human elements, and militant tactics, cannot be other than destructive of these conditions. When it is found that this is the mutual view, then is the time to seek a reformation, and to search out seriously and with set purpose means of bringing it about. If the old order can be changed, if new doctrines can be found, accepted, and applied, with a common will to make them effective, then industry will be elevated, and in the process the workers also as being an integral part of it.

With the will to be constructive, there is much to be gained from the new movement which was inaugurated at the conference last Thursday between administrative

representatives of a large section of industry and the General Council of the Trade Union Congress. The bringing about of this inaugural meeting, which will be outstanding in our industrial annals, is due to the feeling that there is room for something to be done to the general advantage, and that it should not be, by investigation, beyond the wit of these industrial leaders to find ways and means for fashioning new methods of a co-operative nature. They will show their strength by perseverance, and by ignoring the screechings of a minority who regard any attempt at being constructive in this direction as merely a farce; who, oblivious of the facts and mutations of the times, think that what has been must be, and that there can be no change other than development on the old lines, at the end of which stands ruin. Thank goodness there are men in every section of industry, as shown by presence and speeches at the conference, who see these things, and are persuaded that the time has come to leave the old road and set about the construction of a new one, along which the objective of betterment can be more readily attained. To confess that there is no hope of achievement is simply to acknowledge weakness. The robustness of the speeches of Sir Alfred Mond (who was in the chair), of Mr. Ben Turner, Sir David Milne-Watson, Mr. Will Thorne, M.P., and several others (Mr. Arthur Hayday, M.P., was also there) shows that there is a strong determination to investigate and, if possible, to create. Part of the gas industry has already gone a long way along the road in demonstrating what can be done by co-operation through co-partnership; and we see no reason why industrial participation should not be a far more effective policy for all trade unions than industrial cleavage. They would be totally blind trade union leaders who did not see for their members a gain in this. We agree entirely with Mr. Ben Turner that there are fundamental principles in the trade union movement which cannot be abandoned; but we are sufficiently acquainted with his views to be aware that he is not so enamoured of the past that he cannot conceive of the displacement of the ineffective by something that will be more effective in producing betterment. And betterment for all concerned in industry can only come through the strengthening of industry itself. Every intelligent man must see this, unless he has a political motive for pretending to be unconscious of it.

The conferences which have started so well are for joint investigation and not negotiation. The object is to endeavour to ascertain the routes to a new policy. There is no need to hurry matters. There must, in fact, be no haste. The thing must be well done, by close examination, deliberation, and finally decision and recommendation. The conditions are complex, and have extensive ramifications. But they are the work of men, time, and circumstances; and men's brains and time must be devoted to rectification where defect of any kind exists. By care it is as easy to construct correctly as incorrectly. But nothing can be done by the conference which will bind industries or unions. If good results, it can only go forward in the nature of recommendation; but the constitution of the conference is such that it is powerful. Hence the reason for an effective outcome. If this is not the result, a great opportunity will have been lost for the workers, our industries, and the country itself. We need not follow Sir Alfred Mond through the changes in industry which have eliminated much that was originally good, but which have been necessary to maintain an economic and competitive state in industry and commerce. We will only touch lightly on one phase of change. In pointing out how necessary were amalgamation, rationalization, and new processes and methods to the progress of home industry in order to keep its place in the world's competition, he mentioned how these things necessitated the displacement of some men from their old jobs. One of the duties in the new industrial policy should be to assist in the transference of such men to new employment, or to make room for the younger men by pensioning the older ones. The gas industry has never been greatly troubled over this question of men displacement by the introduction of new processes, for the simple reason that, in the mass, employment in its case has been continuously increasing in volume, and new processes in its work have always meant improvement in the operating conditions of the men, and therefore in their standards of life. Admittedly, all industries are not so fortunately circumstanced. Another matter Sir Alfred suggested is the improvement of the security and status of the worker, with participation in the profits of industry. He urged recognition of the indisputable fact that the workman is an integral part of the profit-earning capacity of an industry. The worker should also be given information concerning, and an interest in, the industry in which he is employed. Several social problems were also instanced. Investigated, too, should be the effect of national taxation and rates upon the development of industry; the causes of trade disputes, and the best way of avoiding them; and the creation of some standing Committee to meet for consultation from time to time on topics affecting industry.

There the conference has a statesmanlike basis from which to start and develop investigation, with the view of re-creating industrial relationships for the realization of the maximum benefit for all concerned. The conference is free from all political interference. It is a conference of men equally involved in an industrial cause. The gas industry has, on the whole, good relations with its men; there are naturally little troubles, which arise from looking at things from different angles, but which are usually overcome by joint examination and decision. But the industry and its men are at times very much affected, in respect of materials and trading, by disturbances in other fields of industry; and no one realizes this more than Mr. Clynes, Mr. Thorne, Mr. Hayday, and other leaders. Moreover, not only on this ground are the men of the gas industry desirous of good resulting from the conference and investigation which are now in being, but on that larger one of the peace and prosperity of their country and their fellows generally—realizing as they do that we have a community of interests which right policy can promote, wrong policy retard and even destroy.

Prolific Gas Business in the United States.

WHEN the Electricity Supply Act of 1926 was going through its heavily obstructed parliamentary course, a great many loose statements were made as to the progress of electricity supply in the United States—of course, with the view of disparaging what had been done by the electricity industry in this country. In other words, the object was to show that in electrical development the responsible men in this country were sluggards, and those in America go-ahead; hence the need for Government intervention. Many of the paraded figures represented flights of imagination; and some of our electrical friends who swallowed the data with obvious relish read into them indications that in the United States gas was on its last legs. They hoped that, as a result of the Government electricity scheme, something of the same kind would happen in this country. However, their ill-founded anticipations as to what was going to occur in the United States through the fancied gas-banishing ability of electricity will be completely shattered by the newly published facts relating to the position of the gas industry there. Gas is very much alive, and its use is expanding in such prolific manner that our friends responsible for the interests of the industry foresee remarkable claims upon their energy to meet the demand.

The President of the American Gas Association (Mr. Oscar H. Fogg) has been reviewing the affairs of the gas industry in the States, as presented by the experiences of 1927, and as he gauges them prospectively. From his exercise, we see that the preliminary estimates of gas sales for 1927 total to 475,000 million c.ft., which is an increase of 20,000 million c.ft. over the record-breaking total of 1926. Of the aggregate sales last year, 334,000 million c.ft. were sold for household purposes; 135,000 million c.ft. for industrial and commercial uses; and 6000 million c.ft. for miscellaneous purposes. The gas industry in the States is paying great attention to the development of the industrial and commercial side of the business. Already it represents 28·4 p.ct. of the total sales of gas; and last year it had a growth of no less than 9000 million c.ft. It is also of interest to learn that in the past twenty-five years the aggregate sales have increased by 352 p.ct.—an average per annum of

about 14 p.ct. These figures do not by any means support those electrical men in this country who have entertained visions of the gas industry in America becoming defunct through the operations of electricity.

Regarding the future, our friends in the United States are great on making surveys to ascertain the extent of potential business. It is an excellent proceeding; and it supplies a definite guide as to where to operate. An interesting point revealed by such surveys is that the larger communities show a greater percentage of families utilizing gas service and appliances than in the smaller ones. A survey is mentioned by Mr. Fogg which covers 2228 communities; and this discloses that 75 p.ct: of all families living in towns of from 5000 to 100,000 population and over have a gas service, while the percentage for communities under 5000 is only 54. In towns of 100,000 population and over, 79 p.ct. of the families have gas ranges, while in towns between 5000 and 10,000 population, the percentage falls to 47·9. We rather think that something of the same kind would be found by investigation on like lines of the conditions in this country. In America long-distance transmission of gas is receiving consideration with the view of developing business in the smaller towns. A factory survey shows prospects of an additional industrial heating load of 75,000 million c.ft., excluding the newly opened fields of central heating, refrigeration, incineration, and large-volume water heating. In connection with heating, a striking figure given by Mr. Fogg is that in Chicago a difference of 1° in mean temperature causes a difference of 1 million c.ft. in the daily output of gas for that city.

To the development of the gas business, there is no question that good contribution is being made by the American Gas Association Gas Appliance Testing Laboratory. There is recognition of this in the review, as there is also of the success of the efforts to develop the holding of shares by gas consumers and employees. This is a plan often advocated here, but through the statutory conditions of gas stock issuing not so widely adopted as is desirable. Another suggestion which strikes us as good is that gas men should try to inculcate among the public the idea that coal is not a fuel, but a raw material; but, of course, the difficulty is to get people to absorb such an idea after using coal as a fuel throughout their lives. There is prediction in the review that gas production development will tend to the establishing of giant gas plants at strategic points throughout the country, with a network of mains distributing gas long distances at high pressures.

It will be seen from these brief notes on Mr. Fogg's interesting epitome of the affairs of the gas industry in the United States that the lines of development there are very much the same as those that are being pursued in this country, with the exception that our vision is rather more restricted by scope and circumstance than that of our friends across the Atlantic.

London Floods and Gas Supply.

An article in later columns shows the extent to which the recent London floods affected the gas-works. There was no interruption of supply, though one station of the Gas Light and Coke Company—Nine Elms—temporarily ceased gas making.

Nota Bene.

The Annual General Meeting of the National Gas Council has been fixed for Tuesday, May 22. This should be an interesting occasion, in view of the plans for new legislation for the industry.

Manchester Gasholder Explosion.

It is understood that the official inquiry into the gasholder explosion at the Bradford Road Gas-Works of the Manchester Corporation will be held this month.

The Coal-Selling Schemes.

An official report has been issued of a meeting of representatives of the South and West Yorkshire and Nottinghamshire and Derbyshire Coalowners' Associations which was held in Sheffield last Saturday for the consideration of the coal-marketing scheme which the coalowners propose to put into force. It states that the scheme is being formally constituted, and the preparatory work in connection with the formation of the three main committees is proceeding, and such Committees will shortly be functioning. Already other districts are approaching the Three Counties Committee with a view to the scheme being framed so as to admit of their admission. There is a prospect that eventually the whole of the Midland coalfield, including Lancashire, will be embraced by the scheme. Important developments may therefore be expected at an early date.

Students in Scotland.

In connection with the Institution Education Scheme, the Council of the North British Association of Gas Managers are offering very practical assistance to students in "Gas Engineering" or "Gas Supply" who are so situated geographically that they cannot attend any of the recognized technical college classes. The Council are prepared, in certain circumstances, to grant assistance in the payment of fees for Correspondence Classes in both or one of the branches of study. A letter from Mr. David Fulton, of Helensburgh, which appears in our "Correspondence" columns to-day, enlightens "isolated" students as to the conditions attaching to this generous offer.

Dehydration of Gas.

An engineering friend, referring to the recent discussion of the partial dehydration of gas, calls attention to a paper by M. Lucien Brémond on "Naphthalene in the Manufacture of Illuminating Gas," which was read at the meeting of the Société Technique de l'Industrie du Gaz in 1877. For this a premium of 250 frs. was awarded. Without referring to the contents of the paper at any length, we may (in view of current interest in the question) extract the following passages from it: "Now, these observations and experiments bear upon one single point—viz., that naphthalene is produced wherever there is condensation of the aqueous vapour contained in the gas; that its deposition is preceded by this phenomenon of the condensation of the water; and that gas absolutely deprived, as far as possible, of aqueous vapour (for the absolute drying of a gas is very difficult to realize) does not deposit naphthalene under the ordinary conditions of temperature and pressure. If, then, naphthalene pre-exists in the gas after its purification, if its crystalline deposit is due to a physical phenomenon, if that crystallization is preceded by the condensation of the aqueous vapour contained in the gas, it obeys a law which might be thus expressed: In a mixture of several vapours, when one of these vapours attains its point of condensation, it displaces the point of condensation of the vapours with which it is mixed. Up to now this law has neither been laid down nor verified." In an appendix to the paper, the author dwelt on an interesting result obtained by drying the gas. He said: "By whatever process this drying may be effected—by dry lime, sulphuric acid, chloride of calcium, &c.—the illuminating power of the gas is improved to a considerable extent." M. Brémond's paper, read fifty years ago, was published in the "JOURNAL" for Sept. 25, 1877, pp. 491-4.

Thermal Value of Refuse Depreciating.

The contents of the dustbins of this country are depreciating in thermal value. We learn this from a paper which Mr. Arthur B. Scorer read last week before the Institute of Fuel, and in which he discussed the "Utilization of Town Refuse and Refuse Values." For the depreciation of the calorific value of house refuse, the gas industry must be held responsible. The refuse of twenty years ago was much richer in steam-raising constituents than it is to-day; and its greater poverty now is attributed to the development of the use of gas-fires and gas-cookers, which has eliminated a lot of cinders. Moreover, the cinders in refuse vary in quantity with the season of the year. In winter they may amount to about 35 p.ct., and in summer to as low as 20 p.ct. Their calorific value is about 8000 B.Th.U. per pound. The value of cinders screened from town refuse is given as from 5s. to 8s. per ton, according to

locality and demand. One other point is worth noting in connection with the use of refuse destructors for the production of steam for electricity generation. Unscreened refuse has a calorific value of 2500 to 3000 B.Th.U. Multiplying by 2240 lbs., and allowing 1½ lbs. of steam per lb. of refuse, we have 3360 lbs. of steam per ton of refuse. Seeing that a modern turbine set will give a KW.-H. for 15 lbs. of steam, the 3360 lbs. of steam is equal to 224 units per ton of refuse.

Co-operation in South Wales.

Labour is giving fresh evidence almost every week of the fact that it is seeing matters in a new light. Among them is that strife is not the way to a common prosperity, and that co-operation is. The South Wales miners realize that everything which raises the cost of their product to customers reacts on employment; and thus it is their local Federation are co-operating with the coalowners in an endeavour to secure lower railway rates and dock charges. A joint deputation is desirous of interviewing the Prime Minister on the subject of the difficulties with which the industry in South Wales is faced, and the miners' representatives and the coal owners are collaborating in the preparation of the case for presentation to Mr. Baldwin.

Work for the Workless.

It was announced in the House of Commons on Dec. 7 that the Government were about to appoint an Industrial Transference Board, whose duty would be to devise means for the transference of workers, and in particular of miners, for whom opportunities for employment in their own district or occupation are no longer available. The Minister of Labour has since appointed the Board; the members being: Sir Warren Fisher, G.C.B., G.C.V.O., Sir John Cadman, K.C.M.G., D.Sc., and Sir David Shackleton, K.C.B. Mr. W. G. Eady is the Secretary, and Mr. H. D. Hancock the Assistant Secretary. The offices of the Board will be at the Ministry of Labour, Montagu House, S.W. 1.

Unemployment.

During December, the number of unemployed persons on the registers of the employment exchanges moved acutely both ways. On Dec. 5 the number was 1,149,600. This was 4370 more than the week before. On Dec. 12, the number was 1,125,200, which was a reduction on the preceding week. There was the same experience up to Dec. 19, when the total entry of unemployed persons was 1,099,900. But by Jan. 2 the number rose to 1,322,300. The figures show that there was a temporary ascent in employment owing to the Christmas trade; but when that ceased, and probably on account of the severity of the weather, the amount of unemployment increased.

PERSONAL.

EASTBOURNE GAS COMPANY'S INTERESTING COMMEMORATION.

The members of the Secretarial staff of the Eastbourne Gas Company, with their wives and ladies, met in festive mood on the 6th inst. in the large cookery room at headquarters, where an excellent dinner (prepared on the premises) and a first-rate entertainment were greatly enjoyed by nearly a hundred guests. The occasion was a New Year jollification; but a glance at the toast list revealed the fact that behind all the fun was another object of the deepest interest to everybody. The Chairman (Mr. M. L. Lambert, Assistant Secretary), having submitted "The King," plunged straightaway into the real purpose of the gathering, by proposing the toast of "Our Chief —Mr. James S. Garrard." In kindest terms, he reminded the staff that their Chief had completed 25 years as Secretary to the Company, and also as the friend and counsellor of everyone present, all the time. Moreover, their Chief had now completed 50 years' service in the gas industry—at Ipswich, Cheltenham, and Eastbourne. He called upon all present to drink the health of the kindest and best "Guvnor" that any staff could possibly have. In the name of the entire staff, he then made a commemorative presentation to Mr. Garrard of a beautiful portable five-valve wireless receiver (Pye), a silver plate attached to which bore the following inscription:

> Presented to Mr. James Stephen Garrard, as a token of their affectionate regard, by the Secretarial staff of the Eastbourne Gas Company; and to commemorate his twenty-five years' association with them as Secretary, and his fiftieth year in the gas industry. Jan. 6, 1928.

Mr. G. J. Molyneux submitted the toast of "The Visitors," to which the senior Director (Mr. Benjamin Bradford) responded in happy terms.

Mr. A. H. BARKER, M.Inst.C.E., of 100, Victoria Street, London, S.W., has been appointed Consulting Engineer for the million pound rebuilding scheme of the University of Leeds, for which Messrs. Lanchester, Lucas, & Lodge are the Architects.

In succession to the late Alderman W. F. Vint, who was Chairman of the Sunderland Gas Company for many years, the Directors have appointed Mr. T. S. SHORT. Col. T. W. STUART will take Mr. Short's place as Vice-Chairman.

Mr. HARALD NIELSEN has been appointed Fuel Technologist to Messrs. "B. & L." Powdered Fuel (the Brand System).

Col. G. R. LANE FOX, M.P., has resigned the office of Secretary for Mines on his appointment as a member of the Indian Statutory Commission, which is leaving England for the East to-morrow. Commodore H. DOUGLAS KING, D.S.O., has, with the approval of H.M. the King, been appointed to succeed to the office of Secretary for Mines.

The Managing Director of the Davis Gas Stove Company, Ltd., Mr. CYRIL DAVIS, desires us to state that he has no connection whatever with the firm trading under the name of Messrs. Cyril Davies & Co., Ltd., of 116, Victoria Street, S.W. 1.

OBITUARY.

It is with very deep regret that we announce the death, at Barton-on-Sea last Saturday morning, of Mrs. WALTER T. DUNN, wife of the Secretary of the Institution of Gas Engineers. Mrs. Dunn was taken ill at Christmas time; and anxiety on her behalf since then has kept our friend from town. The end came suddenly. The sympathy of the whole gas industry and of a wide circle of personal friends will be extended to Mr. Walter Dunn and his family in their great sorrow; a striking, though gentle, personality will be sadly missed from the social events of the Institution meeting. The funeral is at Wandsworth Cemetery, at 1.30 p.m. to-day.

It is with regret that we have to announce the death of Mr. W. EVERY, Public Lighting Inspector for the area of the Metropolitan Borough of Stoke Newington under the Gas Light and Coke Company; cerebral hæmorrhage being the cause of death. The deceased was one of the early members of the Association of Public Lighting Engineers.

The death occurred on Sunday, Jan. 15, at the age of 43, of Mr. JOHN FREDERICK WEST, of Springfield, Hipperholme, after a short illness. Mr. West was a Director of the firm of Messrs. Nicholson & West, Ltd., of 14, Northgate, Halifax, having been with them for about thirty years.

We regret to announce the death of JOSE FORMICA-CORSI, Managing Director of the Gas and Electricity Company of Seville.

The death occurred at the Gas Offices, Horwich, on Jan. 6, of Mr. A. H. BROMLEY, one of the oldest employees of the Bolton Corporation Gas Department. Deceased had been in the service of the Department for 55 years, starting as an apprentice gasfitter at the age of 11. He worked as a journeyman prior to being placed in charge of the Horwich branch when it was opened 32 years ago.

Liquid Fuel from Water Gas.—Among the research work being pursued in the Mining Department of the University of Sheffield, in addition to the drying and low-temperature carbonization of coal, is the production of liquid fuels by heating a mixture of water gas and hydrogen under pressure. Special research work is being carried out on behalf of the Anglo-Persian Oil Company, with the object of perfecting a method of manufacture of liquid fuel from the large quantities of natural gas produced in the oilfields.

A "Calendar" Correction.—The Cork Gas Consumers' Company call attention to an inaccuracy in the information given regarding their undertaking in the directory section of the "Gas Journal Calendar" for this year. The correct particulars should be as follows: "R. Healy (S.); J. McNicholl (E. & M. of Works); T. P. Travers (Distribution Engineer); Calorific value 500 BTh.U. since July 1, 1927; price per therm 12½d. since Oct. 1 (present price 11½d.); gas made for year ended June 30, 1927, 401,663,000 c.ft. = 1,908,000 therms. The general management of the Company is in the hands of the Directors and Secretary. We should like to say here that to every undertaking mentioned in the "Calendar" a form of return is posted annually for the necessary particulars. If the form is mislaid, destroyed, neglected, or lost in the post, no blame can attach to us.

NATIONAL GAS COUNCIL.

A Meeting of the Central Executive Board of the National Gas Council took place on Jan. 10, at 28, Grosvenor Gardens, S.W. 1—Sir DAVID MILNE-WATSON in the chair.

Before the proceedings were commenced, a vote of sympathy was moved, all the members standing, on the report of the death of Mr. Leon Gaster, Hon. Secretary of the Illuminating Engineering Society.

CONJOINT CONFERENCE OF PUBLIC UTILITY ASSOCIATIONS.

A meeting of the above Conference was reported to have taken place on Jan. 6, when the following matters were among those discussed:

Mains and Cables in Highways.

The Conjoint Conference had received a report from their Mains and Cables Committee, dealing with:

(*a*) Co-ordination between highway authorities, the Post Office, and public utility undertakings, with regard to the opening-up of highways and the reconstruction of carriageways.

(*b*) The location of mains.

(*c*) The width of footpaths, and their availability for accommodating sub-surface works of public utility undertakings.

(*d*) The following recommendations in the second annual report of the London and Home Counties Traffic Advisory Committee—viz.:

That the highway authorities and undertakers concerned should give immediate consideration to road and roadside obstructions which may be considered to be a source of danger to pedestrians or vehicles, with a view to their removal.

That the highway authorities and undertakers concerned should consider whether more effective steps could be taken for dealing with those portions of the carriageway which have been opened up for the laying of pipes, cables, &c., and then temporarily restored, in order that the temporary surface may be maintained at the proper level.

(*e*) The question as to the practice of concreting existing roads in which mains and cables are already situate, and where land on either side of such roads is being used for development purposes.

Smoke Abatement Act, 1926.

The Conjoint Conference agreed to ask for representation upon the Conference of Local Authorities in London and Greater London, which had been convened to consider the administration of the above Act.

ANALYSIS AND SAMPLING OF COAL.

The Central Executive Board decided to nominate as the Council's representatives on the Sectional Committee of the British Engineering Standards Association, which is to consider approved methods for the commercial analysis of coal—Mr. H. Hollings and Mr. L. H. Sensicle.

GAS CHARGES COMMITTEE.

Mr. C. F. Botley, Chairman of the Gas Charges Committee of the Council, reported that the Committee's Report was in the hands of the printers, and would be circulated in sufficient time to enable it to be discussed by the Board at their meeting on Feb. 14.

DATE OF ANNUAL MEETING.

It was agreed that the Annual General Meeting of the National Gas Council should be held this year on May 22.

NOTES FROM THE AMERICAN GAS ASSOCIATION.

INDUSTRIAL RESEARCH REPRESENTATIVE.

Mr. Eugene D. Milener, who has been with the Consolidated Gas, Electric Light, and Power Company of Baltimore (Md.) for many years, is now Industrial Gas Research Representative of the American Gas Association. His new duties will include contact with field work for the "A.G.A." Committee on Research in Industrial Gas Utilization. This Committee has direct charge of the $500,000 research programme of the Association.

Mr. Milener is a graduate of Baltimore Polytechnic Institute and the University of Maryland. He entered the employ of the Baltimore Company in 1910, and since that time has served in various departments. In 1915 and 1916 Mr. Milener conducted in Baltimore original tests from which the gas house-heating business of the city has developed. He has been identified with this phase of the gas business since that time. When he severed his connection in Baltimore, he was Supervisor of Fuel Sales. He has been specially active in committee work for the American Gas Association, and has served on the Managing Committee of the Commercial Section and the Industrial Gas Section. He acted as Chairman of the Committee who prepared the approval requirements for central gas-fired house-heating appliances.

TECHNICAL PAPER CONTESTS.

A special contest to be conducted every year for the Beal Medal of the American Gas Association has been announced by Mr. H. W. Hartman, Assistant Manager of the Association, and Secretary of the Technical Section. This medal, awarded for the first time in 1897, is given by the Beal family for the best technical paper submitted at the annual "A.G.A." convention.

"All members of the Association have been invited to submit papers on technical subjects," Mr. Hartman says. "A Special Sub-Committee of the Technical Section will judge the papers and select three for presentation at the sessions of the Section during the annual convention. They will thus become eligible for the medal. The main condition specified by the donors of the medal has been that the subject shall cover original work on technical developments of fundamental importance to the industry. This does not exclude new or novel methods of handling existing problems or apparatus, but rather confines the award to the outstanding paper representing a distinct contribution to the progress of the industry. The competition will make it possible for all interested in the technical phase of the industry to receive the highest honour that the Association can give to members in this important branch of activity."

The Beal Medal was originally presented by the late Mr. W. R. Beal in 1897, for the best paper read at the meetings of the American Gas Light Institute; and the offer was renewed when the American Gas Institute was formed. When the American Gas Association was incorporated in 1919, Mr. T. R. Beal generously renewed the offer on behalf of the Beal family, specifying that the medal be awarded for the best technical paper presented at the annual convention of the American Gas Association.

FORTHCOMING ENGAGEMENTS.

[*Secretaries of Gas and Kindred Organizations are asked to assist in making this diary of events as complete and useful as possible by sending the earliest intimation of all meetings.*]

Jan. 21.—YORKSHIRE JUNIOR GAS ASSOCIATION.—Meeting in Bradford. Lecture by Mr. H. R. Hiscott (Le Bas Tube Company, Ltd.) on the "Manufacture of Malleable-Iron Pipe Fittings, Wrought-Iron and Steel Tubing, &c."

Jan. 23.—BRITISH COMMERCIAL GAS ASSOCIATION.—Meeting of the Executive Committee.

Jan. 23.—INSTITUTION OF WELDING ENGINEERS.—"Electric Welding Repairs to Inflated Gasholders," by Mr. A. E. Plumstead. Caxton Hall, Westminster. 7.30.

Jan. 25.—BRITISH COMMERCIAL GAS ASSOCIATION.—Meeting of the Northern District Committee in Newcastle.

Jan. 25.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS (EASTERN DISTRICT).—Meeting at No. 28, Grosvenor Gardens, 2.30.

Jan. 26.—MIDLAND ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Jubilee dinner, followed by cabaret, at the Queen's Hotel, Birmingham.

Jan. 27.—BRITISH COMMERCIAL GAS ASSOCIATION.—Scottish District Conference in Edinburgh.

Jan. 27.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Meeting at the Westminster Technical Institute. Paper by Mr. F. M. Birks, O.B.E., on "Notes on the Mechanical Work at the Beckton Station of the Gas Light and Coke Company."

Jan. 28.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Visit to the Provan Chemical Works, Glasgow.

Feb. 14.—NATIONAL GAS COUNCIL.—Meeting of the Central Executive Board.

Feb. 14.—FEDERATION OF GAS EMPLOYERS.—Meeting of the Central Committee.

Feb. 21-24.—CARBONIZATION CONFERENCE.—Midland Institute, Birmingham.

Feb. 20-March 2.—BRITISH INDUSTRIES FAIR.—Birmingham and London.

Feb. 22.—BRITISH COMMERCIAL GAS ASSOCIATION.—Meeting of the General Committee in Birmingham.

March 2.—"B.C.G.A." INDUSTRIAL SALESMEN'S CIRCLE.—Meeting in Birmingham.

INSTITUTION OF GAS ENGINEERS.

Feb. 13.—Emergency Committee, Finance Committee, Council Meeting.

Feb. 14.—Gas Education Executive Committee.

"Modern Coal-Washing Practice."—This is the title of a book by R. C. R. Minikin, which has been published by Ernest Benn, Ltd., at 45s. net. It will be reviewed in due course in the "JOURNAL."

ELECTRICITY SUPPLY MEMORANDA.

LAST week we failed to trace in the opinions of leading electrical men anything but indefinite expressions of opinion regarding the prospects of the electricity industry in the current year. It is rather unfair for the electrical papers to ask these men to express views which must partake more or less of the nature of prophecy, and be put in a more or less vague manner. As in looking forward, so in glancing back, the reviewers are not over-enthusiastic. "Hotspot," the writer of "Cooking and Heating Notes" in the "Electrical Times," gazing backwards, says gloomily: "The abnormal boom of the latter half of 1926 has been followed by a year of only normal progress." The "abnormal boom," according to the report of the Electricity Commissioners, was measured by a 3 p.ct. increase in the electricity output in 1926, which does not savour of abnormality. "Hotspot" explains that normal progress may seem reasonable enough; but "it means also that a great opportunity has been missed, in that the boost given to electrical apparatus by the shortage of coal has not been followed up and exploited to the extent that it might have been." Is it not also reasonable to suggest that the experience of electricity consumers in 1926 was the normal one—that heating for any purpose by electricity is so atrociously dear that only the ordinary quantum of gullible people could be prevailed upon last year to give trial to the dearest heating agent on earth? We really do not think it was the want of exploitation (what about the Wiring of Homes Campaign?) that caused nothing in the nature of exceptional business last year. It is householders' experience that is adding to the difficulties of the electrical situation. But someone, and not the commodity, must be blamed. "Hotspot" tries to fasten the blame on supply engineers. He would not have done as they did. They refrained too long before increasing the price of electricity at the time of the coal stoppage, with the result that consumers were paying for electricity at high prices when gas and coal were falling to the normal. Memories are short. Electrical journalists last year were boasting long before gas reached pre-stoppage levels that electricity prices had receded to them. Of course, supply engineers do not determine prices; they simply recommend. However, "Hotspot," profoundly wise, thinks an important point of policy is involved here; and he opines that the matter deserves very careful consideration with a view to future similar occurrences. We devoutly hope there will not be any similar happenings. But, of course, nobody knows.

Reason or Excuse.

Leisurely Movement.

However, our informant thinks that electric fire manufacturers have really little of which to complain, though, it is admitted, the year's results have been only "moderately good." As to electric cookers, manufacturers report a satisfactory volume of business in the twelve months; but things are rather quiet at the present time. It is thought by "Hotspot" that supply undertakings have been too busy in other directions to cultivate the cooker load as assiduously as they might. He instances, as one direction, assisted wiring for lighting purposes. Of course, we must accept as true our virtuous friend's statement that he knows of a number of supply areas in which neglect of the cooker load has temporarily resulted from this cause; one trouble being that mains installation engineers have too much to do. That is a reflection on administration. The simple cure for that condition, with an expanding business, is to lighten the task of the overburdened official by increasing his staff. It is a grave defect in management if business is lost through an insufficiency of staff. If all "Hotspot" says is correct, then there are numerous weak places in electrical administration; and such a business paragon as he in this matter ought to be worth his weight in gold to an electricity undertaking looking out for a managerial genius. We are surprised to learn from "Hotspot" that the brightest factor of domestic electrification last year was undoubtedly the rapid development in electric hot-water supply. If that be so, then (knowing something about the subject) we are more than satisfied. He finds promising indications of greater activity in the vast field of industrial heating. So does the gas industry. As to the New Year, "there is nothing very encouraging or otherwise for the immediate future." This we interpret to mean that this observer of electrical movement does not anticipate that at present he will see the industry doing anything more than "mark time."

A Silly Suggestion.

"Meteor" of the "Electrical Times" prescribes a condition of things which would make the country bankrupt in a comparatively short time. He would like to see gas compulsorily evicted from all houses, and electricity used instead. He foolishly suggests a new decree: "Thou shalt not use any gas—thou, nor thy son, nor thy daughter, thy manservant, nor thy maidservant, nor thy cattle, nor the stranger that is within thy gates." The "thou," we take it, means the master of the house. There is one omission—the wife is not mentioned, unless included in the "cattle;" and, in this matter of the agents she uses in domestic service, she is not likely to brook any interference. There are such things as woman's rights; and she would not have such an economical, reliable, and promptly responsive servant as gas turned out just because an individual with animus against it finds recreation, or thinks it funny, to write "nor" and "thy" a number of times. Some people might be excused for thinking this showed signs of incipient aberration. We, of course, know such doings are simply the product of envy, hatred, and malice. However, "Meteor" thinks his simple rule would save a hundred times as many lives as all the anti-electric codes in existence. And, he adds, "it is probably only a matter of time before it will be made the law of the land. Gas will always have its industrial applications; but it should be made a criminal offence to introduce deadly poisons and explosives into the homes of the people." Has "Meteor" already forgotten Hebburn-on-Tyne, Nottingham, Acton, Piccadilly, and Manchester? Has he failed to notice the numerous passings from life to death by electrocution with an absolute absence of warning, such as is given by gas? Has he not heard of the numerous fires caused by electricity? Only a week or two ago, we were told the story of the difficulties of a family during the night—with an aged invalid father in bed, and no other man in the place—through a fusion which was only discovered by someone visiting the room, and seeing flames running along the top of one of the walls near the ceiling, where the electric wire was fixed. The insidious methods of electricity are well known; but we are not prepared to be classified as distinguished fools by proposing a "rule" applying to electricity such as is prescribed by "Meteor" for application to gas.

An Illustration.

As we write, a report is before us, which tells the story of a fire in Glasgow last Monday week. It was a film renter's premises in West Campbell Street. Several people suffered from injuries, damage to the extent of £5000 was done, and 250,000 feet of film destroyed. Early in the afternoon, girls employed in the basement were startled by flames from a fused electric wire. They rushed to the ground floor, and immediately afterwards there was an explosion. Several employees were trapped, but were rescued by firemen.

The State of Unreliability.

The serious failures of electricity supply in London were mentioned at a recent meeting of the London County Council. Inquisitive members wanted to know whether any liability attached to authorized suppliers for failures; and, of course, the Chairman of the Special Committee on London Electricity Supply explained that the undertakers were liable to penalties for default to supply unless caused by unavoidable accident or *force majeure*. That is the position, no matter the inconvenience or the damage occasioned to customers by a collapse, which generally occurs at some inopportune time. On the same occasion, it was stated that the linking-up scheme in London would assist when there was a breakdown of plant, though it would not avoid trouble due to cable fault. There's the rub. Cable faults are as frequent as plant breakdowns. But too much reliance must not be placed on the connecting-up of the stations. As time passes, more extensive areas will be depending on the super-stations; and one of the economies of linking-up these is in the hoped-for limitation of spare plant to 10 p.ct. The area depending upon a single station will be in the aggregate a large consumer of electricity; and if that station has only 10 p.ct. of spare plant, how far will that go in supplying an area which normally depends upon another mammoth station? So far as certainty of supply through connecting-up is concerned when an accident occurs at a station which renders it inoperative for a time, there is, practical consideration shows, a great deal of pretence in the all-will-be-well attitude.

When Electric Cookery will be Universal.

Readers must not be alarmed at the side heading to this paragraph. We have no anticipation that the electric cooker will ever become universal in the same way that the gas cooker has by ousting coal from the kitchen range. Of course, if ever electric cooking did become universal, it could only be at the expense of gas and the pockets of the consumers. It is Mr. J. M. Erskine, M.P., who has foretold the doom of the coal-fire and gas cooker. It is only necessary, according to him, for electricity undertakings to reduce their charges to ½d. per unit. That is all, which shows that Mr. Erskine, like many other politicians when on the electricity question, does not understand what he is talking about. Mr. Erskine, it is obvious, is not an authority on the subject. It is easy enough to say that it is "only necessary" for the ½d. per unit to become a universal charge for something revolutionary to happen. But what are the prospects of this easy thing being accomplished?

Mr. Erskine, we are inclined to assert, has no intimate acquaintance with electricity capital, generating, transforming, and distribution charges. If he had, he would not talk nonsense about ½d. per unit. Apart from that, has he any knowledge of how electricity compares with gas and other fuels in respect of heat energy for money spent? There are gas undertakings that are supplying a therm for 5d. and 6d.; 8d., 9d., and 10d. are common prices, even a distance from the coalfields. No less than 29 units of electricity have to be purchased to equal 1 therm in potential heating energy. At 1d. per unit that is 2s. 5d. per therm; at ½d. per unit, 1s. 2½d. Electricity undertakings are not going to be so idiotic as to make themselves bankrupt by following Mr. Erskine's advice. They want to continue in solvent condition; and they are not above desiring to make a profit—not being philanthropic institutions. In the case of companies, they have only the source of revenue supplied by their commodity; in the case of municipal concerns, they have the rates upon which to fall back, though that is not an honest proceeding when current is supplied below the cost of putting it in possession of the consumers. The occasion on which Mr. Erskine is reported to have made what the "Daily Express" calls his "prophecy," by declaring that "electric cookery will be entirely used in London in twenty-five years' time and nothing else," was the opening, by Mrs. Hilton Philipson, M.P., of the Soho School of Cookery, which has been organized by Messrs. Crosse & Blackwell. Twenty-five years is a pretty safe period for Mr. Erskine to have taken. By that time, if we are all alive, we may have forgotten this particular incident in his career. But if we do not, we may then question him as to why it has not come to pass.

Mishaps. There was an uncomfortable experience at Wandsworth Prison on Tuesday night last week when the electric light failed in the district. Nearly an hour passed before the lighting was normal, during which time arrangements had to be hurriedly made for the prison warders to patrol the corridors with lanterns and torches. Shopkeepers who relied upon electricity had to turn to candles; and cinema proprietors endeavoured to appease their audiences by musical selections until the wayward illuminant could again be brought into action. A displaced conductor rail caused a complete breakdown of the L.M.S. Railway suburban electrified service last Wednesday night. Coming in contact with the other rails, it caused a short circuit. The newspapers report that there was considerable excitement from Broad Street to Richmond, and Euston to Watford, when the short circuit occurred, and three trains were set on fire. The fires, however, were quickly subdued; only electrical machinery was damaged, and not the coaches. How the conductor rail became displaced has not been definitely established; but it is assumed that it was the work of one of the trains from Broad Street to Richmond.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Visit to the Works of the Croydon Gas Company.

On Jan. 14 the Association visited the Waddon Works of the Croydon Gas Company, where they were received by Mr. W. J. Sandeman, the General Manager, and Mr. Walter Grogono, the Engineer, who is a Past-President of the Association. The inspection of the plant, which includes several novel features, was carried out under the guidance of these two gentlemen and Messrs. G. W. T. Tatam (Assistant Engineer), F. J. Harrison, S. Ringham, G. Tebb, P. Woolley, G. W. R. Richmond, J. M. Webber, and W. Bathurst.

The first gas-works in Croydon were erected in 1826, and were acquired in 1847 by the Croydon Commercial Gas and Coke Company. At that time the population of Croydon was about 40,000. It is now reaching a quarter of a million; and the Company, needless to say, have benefited by this increase. In 1894 the Carshalton Gas Company was taken over, and in 1905 amalgamation of the Caterham Gas Company took place. The capital of the Company last year was £1,764,934; the approximate area of supply is 75 square miles; there are 376 miles of mains; and the stoves on hire number 65,763.

The works cover about 40 acres, and are divided into three sections. The carbonizing plant in the first section consists of two retort houses of horizontals. One was built in 1867 and reconstructed in 1920, and contains 140 retorts in settings of 10's. The other was erected in 1875 and rebuilt in 1908, and contains 150 retorts in settings of 10's. The carbonizing plant in the second section similarly consists of two retort houses of horizontals. One house, which was built in 1893 and extended in 1904, contains 232 retorts; the other was completed in 1926, and contains 150 retorts. This house was the subject of an illustrated article in the "JOURNAL" for April 20, 1927, p. 169. All the machinery, with the exception of the compressed air charging and discharging machines in one of the houses in the first section, is driven by electricity.

The third section of the plant consists of five Humphreys & Glasgow water gas sets. Of four of these, each has a capacity of a million c.ft. per day. The remaining set is capable of producing 1,300,000 c.ft. per day, and is provided with a waste-heat boiler.

The power house was built in 1908 and equipped with two 60-KW. "Lancashire" dynamo generators, which are direct coupled to two 90-H.P. "National" gas engines. In 1922 a 125-KW. motor generator was installed for stepping down the Corporation supply of 460 volts to 220 volts. A 350-KW. reducing motor generator is being installed which will augment the existing supply of 220-volt current. There are a few 460-volt motors on the works which take their supply direct from the Corporation.

Included in the equipment in the booster house is a Rateau fan driven by a Brotherhood turbine, capable of pumping 2 million c.ft. of gas an hour. The sulphate of ammonia plant consists of two units—one of a capacity of 7 tons a day, the other of 5 tons. There is a continuous tar dehydration plant dealing with 30 tons of tar a day.

WELCOME BY THE CHAIRMAN.

Following the inspection, the visitors were entertained by the Company at tea.

Mr. WILLIAM CASH, J.P., F.C.A., Chairman of the Company, said how glad he was to welcome the Juniors, and expressed the hope that the visit of inspection had proved of benefit. He felt that the Association was of great value. The administrators of the gas industry appreciated, and derived lively satisfaction from, the keenness of the Juniors, who were always anxious to increase their knowledge and their skill. From the point of view of the Director, this was a great advantage, for the success of the industry depended on the skill of the technical staffs. Mr. Cash concluded his welcome by referring to the Croydon Company's increasing output. During the recent cold spell, all their records had been broken; and it was certain that they would very soon require additional plant.

Mr. LEONARD LACEY, President of the Association, thanked Mr. Cash for his kind welcome. The Association, he said, had visited the Waddon Works in 1915 and in 1922; and those members who had taken part in these visits and who had inspected the works that day would be able to appreciate the growth of the undertaking during recent years. He had been particularly interested in the new "Sentinel" locomotive which had recently been acquired by the Company, and which, it was stated, could perform work that the ordinary type of locomotive could not accomplish. It was also noteworthy that the Company took a wide view regarding the use of electricity on the works, and purchased the current from the Corporation. The visit of the Association that day, continued Mr. Lacey, was in the nature of a special occasion, for during the past year one of their Past-Presidents had been appointed Engineer to the Company.

Mr. W. T. KENSHOLE, of the Lea Bridge Gas Company, proposing a vote of thanks to the Directors of the Croydon Company, coupled with the names of Mr. Sandeman, Mr. Grogono, Mr. Tatam, and the guides, referred to the new retort house, the decision to erect which had been amply justified by the results obtained, and to the fact that all the washing apparatus was housed.

Mr. D. CLEAVE CROSS, of the Lea Bridge Gas Company, in seconding the vote, spoke of the advantages of having clean works. The Waddon Works constituted a fine example of how a gas-works should be kept.

Mr. W. J. LIBERTY supported the vote. He remarked that the first visit of the Association to the Waddon Works was in 1904, when the Association was two years of age, and when he was President. Mr. James Helps, who at that time was Engineer to the Croydon Gas Company, and Mr. Sydney Y. Shoubridge, of the South Suburban Gas Company, were great friends to the Association; and they were proud to think that the present Engineer, Mr. Grogono, was one of their Past-Presidents. Also, Mr. Tatam, the Assistant Engineer, was one of the pioneers of the Association.

Mr. GROGONO, replying to the vote, explained that the Company obtained very cheap current from the Corporation. He looked forward to the time when the whole of the power on the works would be electric. With regard to the carbonizing plant, 91 p.ct. of the retorts were fitted with double ascension pipes, and 45 p.ct. of the plant was equipped with stoking machinery which gave full charges. During the recent cold weather they reached nearly 14 million c.ft. a day; and the last half-year had averaged 71½ therms per ton. He had hoped to have the 350-KW. motor generator for their inspection. This was a reducing type cooled electrically as well as mechanically. It had a guaranteed efficiency of 92 p.ct., and was only half the size of an ordinary straightforward set. With regard to the "Sentinel" locomotive, to which reference had been made by Mr. Lacey, this was the first of its type which had been built, and had two engines on the one chassis. After it had been built it had been submitted for test by the London, Midland, and Scottish Railway. The official report of this test showed that the new locomotive was able to do jobs which could not be tackled by the ordinary locomotive. With a curve of 100 ft. radius with a rise of 1 in 27, and coupled to a load of 150 tons, the locomotive reached its full speed of 8½ M.P.H. in 100 yards. It was anticipated that the wear and tear would be small.

Mr. CASH said he appreciated the remarks that had been made about the Croydon Gas Company. The lay-out of the Waddon Works was due to the skill and ability of Mr. Helps. The new retort house was put up by Mr. Caddick, helped by Mr. Tatam and his staff. On their present Engineer, the Directors of the Company congratulated themselves.

LONDON FLOODS AND THE GAS-WORKS.

AN UNINTERRUPTED SUPPLY.

It is matter for congratulation that so important an element in the life of London as its gas supply should have remained uninterrupted during the terrible visitation of the very early hours of Saturday, Jan. 7, when the River Thames overflowed its banks, and in one spot the retaining wall gave way. This disaster, which occasioned the loss of eleven lives, was subsequently stated by Lord Desborough (the Chairman of the Thames Conservancy) to have been due to a tidal wave, which reached the river mouth at a time when an enormous amount of flood water, due to a rapid thaw following heavy snow storms, was passing down.

GAS LIGHT AND COKE COMPANY'S STATIONS.

All the riverside works of the Gas Light and Coke Company had more or less water over them. At Beckton, however, practically nothing happened, except that one of the cellars was slightly flooded. At both Brentford and Bromley the water gas plants were put out of action for about three hours, because in each case this particular plant was nearest to the river. Then at the Fulham Works most of the retort house cellars were flooded, and water also got into the basement of an exhauster house, and put out of action for rather more than twenty-four hours one retort house which is responsible for 20 p.ct. of the total output of the works.

Effect at Nine Elms.

The most serious results, strangely enough, were experienced in the case of the Nine Elms Works, where such a thing might least have been expected. Here a dock is built in the works; but, in addition to a high-tide wall round the dock inside the works, there is provided on the outside a steel curtain which protects the dock gates. This would have been amply sufficient to cope with any reasonable tide. The water, however, came right over the top of it, and, passing through the dock, flooded the works—filling-up the gasholder wells, and running through the whole system, so that every main underground was choked with water. The exhauster houses were flooded; and the fires were extinguished in the two horizontal houses.

There is, of course, much other manufacturing plant on the works. As a matter of fact, the total daily output capacity of the Nine Elms Works is 13 million c.ft. of coal gas and 5 million c.ft. of water gas—giving a total of 18 millions, of which the two horizontal houses account for about one-third But the effect of the flooding of the mains through the seals was promptly to put everything out of action; and from the early hours of the Saturday morning until the following Sunday night, the works had to remain shut-down, though so far as the actual rise and fall of the river were concerned the whole thing was over in twenty minutes. The task of clearing the mains, wells, &c., of water proceeded without delay. On this the men worked magnificently—frequently up to the waist in water. The fire brigade, too, rendered valuable help by the loan of engines for carrying out pumping operations.

The material damage resulting from the occurrence was of small extent. Other fortunate circumstances were that no personal injury was suffered by anyone on the different works, and that the trouble came at the week-end, when, owing to lessened demands, the drop in make would have been brought about voluntarily, even if the flood waters had not enforced it. As it was, though everything at Nine Elms was in perfect order again by the Sunday night, Mr. Thomas Hardie (the Company's Chief Engineer) decided that, the men having been through such a trying time, manufacturing operations should not be resumed until the following morning.

The Distribution Side.

With regard to the effect on the distribution side of the undertaking, there is little to be said. The subway along the embankment was flooded with water; and in this subway the Company have two mains—one a 36 in. and the other a 30 in. As the subway filled up, these mains floated off the brackets which support them; and a few of the joints were affected, there being some loss of gas, which was promptly checked by the shutting-off of the mains.

On this side of the business, again, the Company were fortunate in that no accident resulted, and the supply of gas was not suspended anywhere.

At Horseferry Road.

It was between Lambeth and Vauxhall Bridges that a portion of the river retaining wall gave way, and a torrent of water poured out into Grosvenor Road, Horseferry Road, and the neighbourhood. Here it was that the greatest loss of life occurred; the figures being seven in Westminster, two in Hammersmith, and two in Fulham. Nine of the victims were females; and the two males (who were drowned in the Westminster area) were both employed in the Rental Department of the Company. They were Frank Willsher (25) and Harry Sears (17).

The new showrooms of the Company in Horseferry Road naturally suffered from flooding, and extensive cleaning of appliances and furnishings was necessitated; but well before the end of last week everything had again been got into perfect order. The telephone service in the immediate area was disorganized; but happily the existence of private telegraph wires prevented the works from being isolated from headquarters.

SOUTH METROPOLITAN GAS COMPANY.

The South Metropolitan Gas Company also had the unique experience of flooded works; but it is pleasing to be able to report that in no case did the water cause serious inconvenience or any interference at all with the work of gas manufacture.

COMMERCIAL GAS COMPANY.

Only the Poplar Station of the Commercial Gas Company was affected by the flood. Mr. A. E. Williams (the Chief Engineer) says the water came over the river wall, and flooded the retort houses to a depth of 2 or 3 ft., but fortunately did not extinguish the fires. A number of mains on the works were partially waterlogged; but it was possible to continue gas making, and normal conditions of working were restored by the Saturday afternoon—a full supply of gas to the district having been maintained throughout.

WANDSWORTH, &c., GAS COMPANY.

In common with the surrounding district, the Wandsworth Gas-Works were, we learn from Mr. C. M. Croft (Chief Engineer to the Wandsworth, Wimbledon, and Epsom District Gas Company), very seriously affected by the flood. The Company's frontage on the River Thames is approximately a quarter of a mile long; but fortunately all this river wall is considerably higher than the general level of the embankment. Consequently all the flooding which took place was from water which came round from the surrounding property on the east and west of the works.

The most serious inconvenience was experienced under the cellar of the main purifier house, where the water ran down the slope and flooded the basement to the extent of approximately 10 ft., and, in many cases, rose to a level above the flood pipe of the water valves, and thus gradually started sealing valves which should have been open, and retarding the flow of gas and putting extra pressure on the plant until 9 out of 15 purifiers were completely sealed. This occurrence was met by blowing-off gas to keep down the pressure at one of the seals fixed in the scrubber yard, where it could be safely carried out.

The flues at the back of the water gas boilers were also flooded; and these flues were put out of order for approximately six hours. In No. 3 retort house—the only cellar retort house at these works—a slight amount of water overflowed the cellar, but fortunately did not rise to more than 18 in. Thus the furnaces were not seriously affected, although a considerable amount of water entered the main flue.

The sulphate of ammonia plant was flooded to the extent of about 2 ft.; and approximately 40 tons of salt disappeared. The building materials store was also flooded to the same extent; and a large quantity of cement was destroyed. About a third of the yard was under water of depths varying from 1 ft. to 2 ft. 6 in.; and the water gas relief holder tank was thus flooded.

The large mechanics' shop was flooded; but no damage was done in this building. The Secretary's office and one or two outlying offices and stores were also flooded; and a considerable amount of damage was done to books and documents. The coal elevator boots in all the retort houses were affected, two being seriously flooded; but at all points where the flooding was likely to be a source of danger to the works, the water was removed by means of five fire engines, aided by the Company's own fire engine and a large emergency pump which is always kept ready-mounted in case of need.

The supply of gas to the district was not affected; and full pressures were maintained. At present there is a new water gas plant being erected, together with a large Babcock boiler house, and also an installation of vertical intermittent ovens; but fortunately all this work was above the flood-line level, and no damage was done.

BOARD OF TRADE GAS UNDERTAKINGS RETURN FOR 1926.

PART II.—FINANCE AND PRICES.

The second part of the Return for the year 1926 relating to all Authorized Gas Undertakings in Great Britain has been issued by H.M. Stationery Office (Adastral House, Kingsway, London, W.C. 2, and Branches), at the price of 10s. 6d. net, postage extra. This furnishes the usual statistics bearing upon finance and prices; while Part I. (which was reviewed in the "JOURNAL" for Aug. 17 last, p. 400) dealt with manufacture and supply.

There are dealt with in this part of the return 782 undertakings, which is the same number as a year ago, but two less than were included in Part I. This reduction is explained by the exclusion of the gas undertaking of the Torquay Corporation and of the Blantyre undertaking of the Lanark County Council. The Torquay Corporation undertaking statistics are included in the particulars relating to the Torquay and Paignton Gas Company, by whom the undertaking was absorbed as from March 31, 1926. The Blantyre undertaking of the Lanark County Council did not become statutory until May 15, 1926; but in the absence of this information, particulars relating to it were included in Part I. On this occasion the companies, at 463, number two less than they did a year ago; but the local authorities, at 319, are two more than was the case in the 1925 return.

The particulars as to prices charged are, unless otherwise indicated, for Dec. 31, 1926, for English and Welsh undertakings, and May 15, 1926, for Scottish ones. The other information given in the return relates (except where otherwise noted) to the calendar year 1926 in the case of companies' undertakings, and, for local authorities, to the year ended March 31, 1927, for concerns in England and Wales, and the year ended May 15, 1926, for those in Scotland.

CAPITAL INVESTED.

The total nominal capital invested in the undertakings dealt with in the return is £179,024,901, including loans borrowed by local authorities and since repaid. This is an increase of £7,036,912 over the amount shown in the previous return. The receipts of the undertakings on revenue account, which amounted to £74,701,868, show an increase of £8,659,225 over the previous year's total; but the expenditure, at £66,972,747, exhibits an increase of £10,064,099, and the gross profit has been reduced by £1,404,874.

Comparative tables in the return, which are reproduced below, set out separately the financial results for the companies' undertakings and those belonging to local authorities for the whole of Great Britain—in the former case for the years 1920 to 1926, and in the latter for the financial years 1920-21 to 1926-27.

COMPANIES.

In connection with the companies, the figures in the body of the return for 1926 are further split-up as follows:

England and Wales.—Total capital authorized, £101,087,609; capital and premiums paid up, £87,398,895; loan capital authorized, £40,992,224; loan capital issued, £25,301,159; revenue account receipts, £48,825,300; expenditure, £43,687,150; profit, £5,154,330 (loss £16,180).

Scotland.—Total capital authorized, £310,656; capital paid up, £259,058; loan capital authorized, £123,491; loan capital issued, £69,125; revenue account receipts, £146,881; expenditure, £124,465; profit, £22,416.

LOCAL AUTHORITIES.

The corresponding figures in the return for the local authorities for 1926-27 are divided-up thus:

England and Wales.—Total amount of loans authorized, £56,057,988; money borrowed, £51,466,824; loans repaid and balance left in sinking fund, £28,127,852; revenue receipts, £21,116,194; expenditure, £19,132,574; gross profit, £2,060,792 (loss, £77,172); interest paid on loans, loans repaid, and amounts placed to sinking fund during the year, £2,484,688; loss, £501,068.

Scotland.—Total amount of loans authorized, £16,374,905; money borrowed, £14,529,840; loans repaid and balance in sinking fund, £6,942,905; revenue account receipts, £4,613,493; expenditure, £4,028,558; gross profit, £584,949 (loss, £14); interest paid on loans, amount of loans repaid, and amounts placed to sinking fund during the year, £725,841; loss, £140,906.

In addition to the columns shown in the tables reproduced, the return gives information as to the Special Acts of Parliament and Orders relating to each undertaking, as well as the maximum or standard price of gas per therm, or per 1000 c.ft., as the case may be, and the actual prices charged to prepayment consumers, to ordinary consumers, for power, &c., and for public lamps. There is also a column showing the scale of annual charges for meter rent to private consumers.

COMPARATIVE TABLES.

Companies' Undertakings.

Year.	Number of Authorized Undertakings included in Return.	Total Capital (Share and Stock).		Total Loan Capital, including Debenture Stock.		Revenue Account.		
		Authorized.	Paid-up.	Authorized.	Issued.	Receipts.	Expenditure.	Profit.
		£	£	£	£	£	£	£
1920 . . .	494	98,469,716	82,065,243	29,109,279	18,418,665	53,714,841	49,566,608	4,148,233
1921 . . .	488	99,422,967	83,063,256	32,357,024	21,104,283	51,870,058	47,588,176	4,281,882
1922 . . .	481	100,437,430	83,793,973	33,751,958	22,011,223	46,541,952	39,785,069	6,756,883
1923 . . .	475	100,374,599	84,561,849	33,957,362	22,035,911	44,226,797	37,839,199	6,387,598
1924 . . .	467	100,553,738	85,537,819	34,581,299	22,544,907	44,293,709	38,756,098	5,537,611
1925 . . .	465	100,871,912	86,557,396	33,146,038	22,778,217	43,931,719	38,098,485	5,833,234
1926 . . .	463	101,398,265	87,657,953	41,115,715	25,370,284	48,972,181	43,811,615	5,160,566

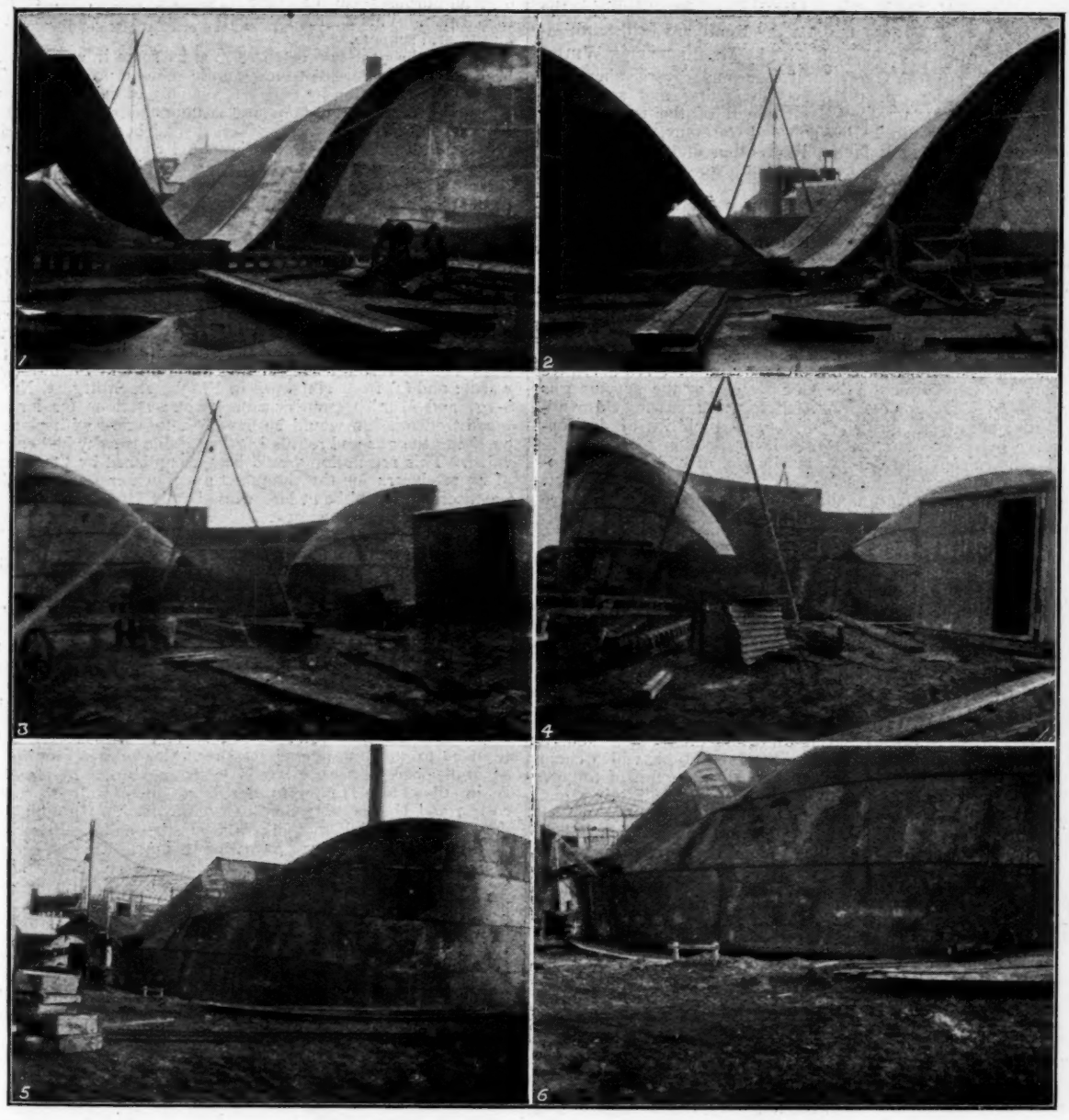
Local Authorities' Undertakings.

Year.	Number of Authorized Undertakings included in Return.	Total Amount of Loans Authorized.	Total Amount of Money Borrowed.	Total Amount of Loans Repaid, and Balance in Sinking Fund.	Revenue Account.			Interest paid on Loans, Amount of Loans Repaid, and Amount placed to Sinking Fund during Year.	Net Profit or *Deficit.*
					Receipts.	Expenditure.	Gross Profit.		
		£	£	£	£	£	£	£	£
1920–21 .	304	52,823,504	48,916,008	25,076,806	27,244,570	24,535,685	2,708,885	2,269,573	439,312 profit
1921–22 .	309	60,767,887	53,770,157	26,725,430	26,569,144	25,061,731	1,507,413	2,610,228	*1,102,815 deficit*
1922–23 .	316	64,519,579	57,123,829	28,616,471	24,084,699	19,414,366	4,670,333	2,901,500	1,768,833 profit
1923–24 .	310	65,533,169	58,612,494	30,027,099	23,349,561	18,754,701	4,594,860	2,965,295	1,629,565 profit
1924–25 .	315	67,625,057	60,323,048	31,746,240	22,416,281	19,131,529	3,284,752	3,026,677	258,075 profit
1925–26 .	317	69,392,637	62,652,376	33,426,330	22,110,924	18,810,163	3,300,761	3,053,909	246,852 profit
1926–27 .	319	72,432,893	65,996,664	35,070,757	25,729,687	23,161,132	2,568,555	3,210,529	*641,974 deficit*

Visitors to British Industries Fair.—On Wednesday, Feb. 22, the Management Committee of the Industries Fair at Birmingham will entertain at luncheon at the Fair the members of the following organizations: Society of Chemical Industry, Institution of Gas Engineers, Coke Oven Managers' Association, Midland Association of Gas Engineers and Managers, British Commercial Gas Association, and the Birmingham Master Painters; and on Friday, March 2, the Industrial Gas Salesmen's Circle; and the Midland Gas Salesmen's Circle will be similarly entertained.

GASHOLDER TANK BLOWN INWARDS BY GALE.

An Erection Difficulty Speedily Overcome.



1. View from Inside of Tank.
2. View from Inside of Tank.
3. Front View from Outside of Tank.
4. Close-Up Front View from Outside of Tank.
5. Side View from Outside of Tank.
6. Close-Up Side View from Outside of Tank.

Messrs. Thomas Piggott & Co., Ltd., of Birmingham, are erecting a gasholder near Accrington. The holder is of the spiral-guided type, having two lifts and a steel tank; the size of the latter being 65 ft. diameter by 23 ft. deep. By Friday, Jan. 6, the tank was almost erected, but not riveted. However, on that day there was a fierce gale; and in spite of the fact that the methods generally adopted by tank builders during erection in stormy weather were taken, the great force of the gale was sufficient to overcome these precautions, with the results shown in the accompanying photographs.

The tank side was blown inwards for a distance of about 90 ft. measured round the top of the side plates; and at the centre of the bend the top edge of the side plates touched the floor of the tank. However, Messrs. Piggott succeeded in getting the blown-in portion back to its original shape in one day, without any detrimental effect on the structure; and on this excellent work they are deserving of congratulation.

Prof. Bone's Idea of the Ph.D. Degree.

At a recent meeting of the Science Masters' Association, Prof. W. A. Bone, F.R.S., said that a young man intending to take a responsible position in industry should take a seven years' training. On leaving school, he should spend six months in a factory, to see what it is like. He should then spend three years taking a general science course at a university. The four post-graduate years should be devoted to special training for his future work; and it is not necessary that this special training should consist entirely, or even partly, of laboratory research. Prof. Bone considers that the London Matriculation examination requires modifying to suit this type of technical student. It should be possible to take the examination in two stages. As to the Ph.D. Degree, he considers it should be abolished as one of the worst things imported from Germany. There should be plain bachelors and doctors of science only; and the doctorate should be the reward of eight years of research.

UTILIZATION OF COKE OVEN GAS.

Continental Developments.

At the December meeting of the Midland Section of the Coke Oven Managers' Association, which was held at Sheffield, the subject of recent developments on the Continent in the utilization of coke oven gas was dealt with by Mr. FREDERICK WHITE, who, referring to the Continental tour made by members last year, said that one of the most interesting and surprising features was the enormous development of the transmission over a wide area, both in Belgium and Germany, and the utilization of coke oven gas for public lighting and industrial purposes. Although bleeder or flare pipes were seen at several of the plants visited, the issue of gas from such pipes was absent. On no coke oven battery inspected during the tour was there any sign of surplus gas being burned away in the atmosphere—a statement which unfortunately could not be made in respect of many plants in this country. The considerable value of such gas was evidently well realized on the Continent; and every opportunity appeared to be taken, as far as possible, in the conservation of this fuel (by substituting an inferior gas, either producer or blast furnace gas), for heating the oven batteries, thus leaving a high percentage, if not all, of the coal gas generated for more useful and remunerative purposes. In addition to the employment of the surplus gas for industrial and domestic uses, there was another field available—one which suggested enormous possibilities of development. He referred to the synthetic production of ammonia, nitric acid, alcohol, &c., in the production of which the hydrogen in surplus gas, as they knew, constituted roughly 50 p.ct. The enormous supplies available of this raw material were therefore evident; and its use on the Continent for the manufacture of those synthetic products—in particular ammonia—was making rapid strides.

LONG-DISTANCE TRANSMISSION IN BELGIUM.

Referring to the utilization of surplus gas in Belgium, Mr. White said that on the visit to the Ostend Light and Power Company they were able to obtain some particulars in regard to the scheme for long-distance transmission of coke oven gas from those works. It was being sent a distance of 43 miles to various gas-works situated in Western Flanders. The gas was produced from two batteries of ovens—one consisting of 50 regenerative ovens erected in 1913, and the other a modern battery of 28 regenerative ovens of the Piette type, which could be heated with either rich or lean gas. An amount of 620,000 c.ft. per day was supplied to Ostend for town lighting and domestic purposes; a further 1,150,000 c.ft. was boosted to Western Flanders for similar purposes; and, in addition, about 530,000 c.ft. was sent to the Ostend-Blankenbergh power station for steam-raising purposes. The works also supplied the adjoining synthetic ammonia plant of the Semet-Solvay and Piette Company. This plant had at present a daily output of 15 tons of ammonia; and for that purpose some 2,470,000 c.ft. of gas per day were required. After the separation of hydrogen, the remaining gas, amounting to 1,235,000 c.ft.—that is, one-half of the original amount—of a calorific value of about 675 B.Th.U., was returned to the coking plant, where, after being mixed with producer and coke oven gas, a portion was used for heating the ovens; the excess being sent for distribution. There was available, also, about 700,000 c.ft. for boilers at the coke works.

For the long-distance transmission, there were two supplies of gas leaving Ostend, one through a 10-in. diameter main and the other through a 7-in. main. At the various towns *en route* there were pressure regulators or governors and gas-holders ranging in capacity from 6000 c.m. (211,800 c.ft.) to 500 c.m. (17,650 c.ft.). The first main ran to Roulers, a distance of 25 miles, where there was a gasholder of 3000 c.m. (105,900 c.ft.) and another of 6000 c.m. (211,800 c.ft.) capacity, together with a booster station for boosting the gas onwards to Menin (12 miles to the south), Thielt (10 miles to the east), and Ypres (12 miles in a westerly direction) through a 7-in. main. At Ypres there was a gasholder of 4000 c.m. (141,200 c.ft.), and also a relay booster forcing the gas further westward through a 5-in. main to Poperinghe (8 miles away), which had a gasholder of 1000 c.m. (35,300 c.ft.). The second supply from Ostend travelled through a 7-in. main along the coast to Nieuport (15 miles away), where there was a gasholder of 4000 c.m. (141,200 c.ft.), and also a relay booster supplying several towns farther along the coast, and also 10 miles inland to Dixmude. Considering that part of the area was over-run by the enemy during the war, the development was striking. The scheme appeared to be quite successful. Gas was being sold to Ostend at a cost of 3d. per therm, and to Western Flanders at 2·2d. per therm.

SURPLUS GAS UTILIZED IN GERMANY.

In regard to the utilization of surplus gas in Germany, at Messrs. Thyssen's works, at Bruckhausen, they learned that, in addition to using a large amount of gas in the steel works, they were also contributing to the grid scheme for long-distance transmission; the gas being sent a distance of 60 miles to towns in the Ruhr area for lighting, &c., and also for industrial purposes—such as lime kilns, brickworks, &c., *en route* to Barmen. This afforded an insight into what was being done by the grid scheme.

During the past two or three months some information had been gleaned in regard to a gigantic scheme proposed in Germany which had for its object the supply of coke oven gas to cities and towns throughout practically the length and breadth of that country. The scheme which had been propounded by the General Coal Utilization Company, comprising Ruhr coal-owners, now appeared to be taking definite shape, although there was likely to be powerful opposition from the large gas companies in the various cities, the result of which might be a modification of the scheme as first prepared.

The main proposals were that the several large coke oven installations in the Ruhr district, already in commission or to be erected, would pump gas into a central main between Hamborn and Hamm. From that central conduit would issue transmission lines in the following directions: (1) Via Bremen and Hamburg to Kiel (northward); (2) via Hanover, Brunswick, and Magdeburg to Berlin and Stettin (eastward); (3) from Hamm through Cassel to Thuringia and Saxony (westward); and (4) from Hamborn to Frankfort, Stuttgart, Nuremberg, and Munich (southward). Power stations for long-distance transmission would be installed, together with plant for purifying the gas and regulating its specific gravity and calorific value. This regulation would be accomplished by the erection of 45 producers for the manufacture of water gas. Of those producers 30 would be at Hamm and 15 in Hamborn.

At the present time most German towns were supplying a gas of 470 to 500 B.Th.U., with a specific gravity of 0·46. The gas from the Ruhr had a calorific value of 530 to 550 B.Th.U., and would therefore have to be diluted if the proposed standard were adopted. The question of purification was of great importance, as it was intended to supply the gas from the ovens freed from tar, ammonia, and benzole. Special purification was to be adopted for the removal of sulphuretted hydrogen and naphthalene by the erection of a large number of oxide purifiers at both Hamm and Hamborn.

According to Herr Müller, who gave some interesting particulars of the proposed scheme in a paper before the German Gas Association last June, the purified gas will be sent out at from 20 to 30 atmospheres pressure. The mains required for 20 atmospheres pressure would be from Hamm to Hamburg 20 in. diameter, Hamm to Berlin 26 in., Hamm to Saxony 20 in., and Hamborn to South Germany 24 in. In addition, a network of subsidiary conduits from the main routes would link-up a great number of local supply lines. Figures given by Herr Müller in regard to cost of mains were: From Hamm to Berlin, which is about 250 miles, a 20-in. main at 30 atmospheres pressure, would cost £1,750,000. A 32-in. main for 15 atmospheres would cost £1,280,000. In the latter case, the compression costs would work out at 0·68d. per 1000 c.ft. less than in the former; and it was estimated that the extra capital cost entailed would be repaid in two years' time. The whole system of mains proposed would cost £16,250,000, which would correspond to a charge of 7·48d. per 1000 c.ft. of gas, or 1·5d. per therm, including compression, purification, and holders. The scheme would necessitate the raising of £20,000,000 capital.

Discussion.

The CHAIRMAN (Mr. C. P. Finn) said coke ovens in certain areas were in a position to supply cheap gas to industries; but there were obstacles in the way by reason of some of the statutory powers given to a gas company. This was a hardship, because they could not develop a supply of gas for industrial purposes. The prices of gas companies were practically "out of court" for the industrial user. It did not necessarily follow that this state of affairs was going to exist for all time in this country; for there was a feeling abroad that they should not be tied-down by Statute. If there was any surplus gas available, they should be in position to use it for industrial purposes; and it was to be hoped that in the future legislation would be brought in to deal with the situation. Gas legislation was at the present time under revision; and they hoped there would be some outlet for gas for industrial concerns where they could supply it.

Mr. DAVY remarked that the coal-owners were watching the Bills of gas companies now in Parliament; and the coke-oven people were fully alive to the interests at stake.

Mr. HATSWELL said they were distributing gas to gas-works from his plant, and had had no difficulty whatever.

Fuel Research Technical Paper No. 18.—In this paper, which has just been published, the authors (J. H. Jones, Ph.D., J. G. King, Ph.D., and F. S. Sinnatt, M.B.E., M.Sc.) deal with an investigation into the reactivity of coke which is in progress at the Fuel Research Station. It describes an apparatus designed to measure the amount of carbon dioxide reduced when the gas is passed over heated coke under standardized conditions. A review of the publication will appear shortly in our columns.

EXTRACTING OILS FROM COAL.

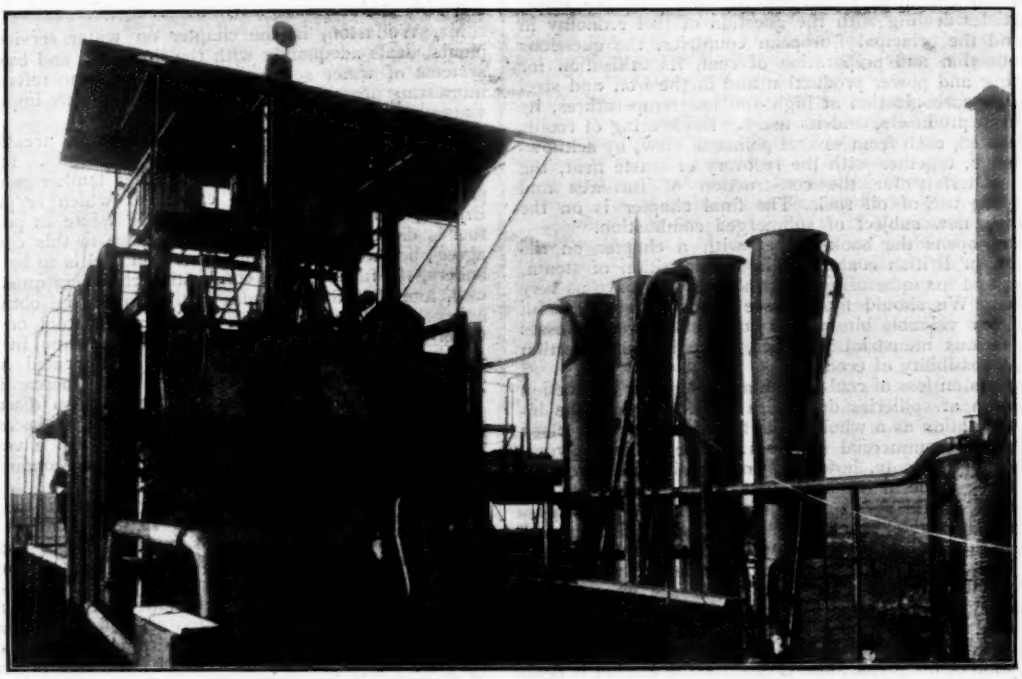
The "Rational" Carbonization of Coal by the Dvorkovitz System.

Through the courtesy of the Rational Carbonization Syndicate, Ltd., of 12, Great St. Helens, E.C. 3, we recently had the opportunity of inspecting a commercial unit, consisting of two 5-ton retorts, working on the Dvorkovitz system, at Slough.

Dr. P. Dvorkovitz, the inventor of this method of low-temperature carbonization, has had wide experience of the problem of oil production from coal, and is an acknowledged expert. A Russian by birth, he was imprisoned under the Bolshevik régime. However, the Bolshevists realized that the knowledge he possessed could not be put to good use if they adopted the customary course, and shot him; so they asked him to conduct experiments on the low-temperature carbonization of coal from the Moscow basin, with the object of oil production. For some time he investigated the oil-producing properties of coals in that area; and when finally he came to this country he was in possession of a vast amount of important knowledge.

Oil the Primary Consideration.

It may be said at once that the primary object of the process in operation at Slough is to produce oil. Gas, it appears, is of no concern whatever, and coke is definitely a secondary bye-product. The plant is simple. Coal is fed into a vertical retort heated externally by producer gas. A certain amount of inert gas is evolved; and this passes through a preheater, where its temperature is raised to *circa* 400° C. At this temperature it passes through the charge of coal in the retort; and its sensible heat, coupled with the external heating, distils the charge. Dr. Dvorkovitz was anxious to stress the fact that the process is one of distillation, not carbonization. The temperature inside the retorts never rises above 500° C.; and the inert gas is circulated and preheated over and over again, to act as a distilling medium.



The oily vapours distilled from the coal are first passed through a system of atmospheric condensers, where the heavier oils are brought down, and then through a water-cooled condenser, where the lighter oils are deposited. The gas, still containing the "motor spirit," is then passed up towers where it meets a descending spray of absorbent oil, which extracts the light paraffins. Finally, the gas passes through lime, which extracts any sulphur present, and is led to the preheater.

The smokeless fuel—it is perhaps incorrect to term it coke—in the installation at Slough is discharged periodically from the bottom of the retort; but Dr. Dvorkovitz explained that in a large plant the extraction would be continuous, as in current continuous vertical retort practice, and the producer gas for heating the setting would be manufactured centrally.

Gas Not Recovered.

Stress was laid on the fact that gas would not be recovered; that evolved from the coal being used merely as a vehicle for sensible heat, and any surplus being employed as an additional agent for the external heating of the retorts. The two retorts at Slough are heated externally by producer gas; and it appears that in this installation surplus gas is wasted. This question was raised with Dr. Dvorkovitz, who said that the amount evolved was inconsiderable at the temperature of distillation employed—viz., under 400° C.—and that its value as an external heating medium was not great. "Indeed," he observed, "the quantity of gas evolved from the coal is so small that we rarely have to open a relief valve in the circuit, and pass it to atmosphere." To our mind, this explanation did not appear wholly satisfactory. Consider for a moment the work of Porter and Ovitz, in America, who have carried out several important investigations into the action of heat upon coal. They found that 10 grammes of coal, at a temperature of 390° C., evolved 197 c.c. of gas having the following percentage composition: CO_2 23·8, illuminants 6·5, CO 16·5, CH_4, C_2H_6, &c., 49·5, and H_2 3·7.

By the following calculation, we arrive at the cubic feet per ton:

$$\frac{197 \times 453 \times 2240}{10 \times 1728 \times 16{\cdot}4} = {\cdot}700 \text{ c.ft.}$$

per ton (approx.)—*i.e.*, 3500 c.ft. per 5 tons.

At 480° C., Porter and Ovitz found that 10 grammes of coal evolved 535 c.c. of gas having the following percentage composition: CO_2 7·6, illuminants 5·0, CO 16·1, CH_4, C_2H_6, &c., 55·0, and H_2 16·3. On the same basis, this works out at 9500 c.ft. per 5 tons.

When this is borne in mind, and the fact that in the Slough installation its potential heat is not utilized, it is concluded that the waste must be more than negligible, and that the plant must be considered as an experimental unit.

Yields from the Plant.

From the plant it is claimed that the following products are obtained per ton of ordinary bituminous coal treated:

Crude oil	30 galls.
Smokeless fuel	15 cwt.

On distillation the oil yields:

Motor spirit	4 galls.
Lamp oil	12 ,,
Lubricating oil	6 ,,
Paraffin wax	24 lbs.
Phenol	40 ,,
Pitch	90 ,,
Ammonia	24 ,,
Sulphur	24 ,,

In the above figures, the ammonia yield, at 24 lbs., seems high for a low-temperature process of this kind. Moreover, the smokeless fuel yield, at 15 cwt., does not take into account the quantity of fuel which must be charged to the producer for heating the setting. This fuel consumption has not been accurately determined at Slough, as it really is not a criterion of what could be done on a large scale. However, if we take the figure of 15 p.ct. which applies in efficient gas-works where

waste-heat boilers are not in operation, the figure of 15 cwt. would have to be reduced by 3 cwt.

It would be interesting to know what proportion of the heating of the coal is effected by the sensible heat of the neutral gas. The circuit is not large in volume, and the circulating gases which pass through the preheater are not raised in temperature more than 400° C. Consequently the sensible heat actually contained in them cannot be great, and even this amount of heat is gained at the expense of fuel in the producer.

USES FOR SMOKELESS FUEL.

This smokeless fuel, it was explained, can be used as fuel for grates, can be employed in a pulverized form for steam raising, and can be gasified completely. Non-caking coals are being distilled at Slough, and the residue does not appear to be suitable for the domestic grate, nor does its structure seem to be suited to efficient gasification.

The installation at Slough is spoken of as a commercial unit, but we were not supplied with figures which would enable a commercial balance-sheet to be worked out—which, after all, is the criterion of the success of any process. At present, therefore, it is difficult to express any opinion as to the ultimate success of the plant commercially. This depends on the price paid for the coal, the cost of treatment on a large scale, the prices obtainable for the oils, and the price at which the smokeless residue can be marketed.

BRITAIN'S FUEL PROBLEMS.*

Reviewed by T. A. TOMLINSON and M. BARASH.

This is an ambitious and, we think, on the whole a successful attempt to bring together into one volume (of nearly 600 large pages) a discussion by all the principal experts of every aspect of the problem of the preparation and utilization of our national fuel supplies—a subject the tremendous importance of which has been more or less fully recognized during the past few years. In ten parts, or rather eleven, including the introductory articles dealing with the question of fuel economy in America and the principal European countries, the questions of the production and preparation of coal, its utilization for steam raising and power production and in the iron and steel industries, its carbonization at high and low temperatures, its gasification in producers, and its use for the heating of rooms are fully treated, each from several points of view, by acknowledged masters, together with the recovery of waste heat, the refractory materials for the construction of furnaces and kilns, and the use of oil fuel. The final chapter is on the comparatively new subject of submerged combustion.

Dr. Slater opens the book proper with a chapter on the classification of British coals; but in his definition of steam, gas, house, and manufacturing coals he does not leave us very much wiser. We should like to see a much more careful division of our valuable bituminous coals into several classes suited to various industrial purposes, since in this direction lies a great possibility of economy.

The chapters on loss of coal in mining and power production and utilization at collieries deal with subjects where the interests of the nation as a whole in its fuel resources may clash with the purely commercial interests of the colliery owner. It is satisfactory to note, however, that considerable progress continues to be made in the utilization of low-grade fuels and of waste heat in the development of power for colliery purposes; and the chapter contributed by Messrs. Sinclair and Stathom on this subject is a well-written and valuable essay marred only by an irritating excess of punctuation. We were particularly interested to note that, while the extension of electric power below ground is inevitably advancing, steam seems to hold its own in the complex mechanical conditions surrounding the problem of the winding engine.

The question of the preparation of fuel for the market is dealt with by Mr. Arthur Grounds assisted by Mr. W. H. Morton. The latter deals first with the dry-cleaning of coal, for the accomplishment of which he describes some extremely ingenious apparatus, besides urging its general superiority over the wet-cleaning process with which Mr. Grounds deals at adequate length and in much interesting detail. He also describes the process of briquetting, by which not only is small and otherwise unsaleable fuel rendered valuable for many purposes, but pitch, a bye-product of the tar industry, is also brought into use as a binder. Little mention, however, is made of other binders or of the Sutcliffe-Speakman process of briquetting under pressure.

Part III. deals with the utilization of coal direct for steam power production and in the iron and steel industry, and a number of experts consider all the principal aspects of these questions under the editorship of Messrs. Selvey and E. C. Evans.

Mr. Miles' chapter on the effect of coal classification on boiler design is an example of the overlapping and repetition which has added unnecessarily to the bulk of this book. Some of his figures are vitiated by the assumption of a constant 0·24 as the specific heat of flue gases. Recent work on waste-heat recovery has shown that this figure is much too rough for practical purposes.

Messrs. Guy and Smith deal with the economic aspects of high pressures and temperatures. The method is statistical, and the results displayed in tables and diagrams are no doubt useful to those whose duty it is to come to a technical decision in a particular case. What we miss is the application of all this to Britain's particular problem. Mr. Kearton, on the rational utilization of steam in engines and turbines, is more practical, but he shows us no more than the other writers how this consideration applies particularly to Britain. For instance, we have a very interesting description of the uniflow reciprocating steam engine, and we are told that among other things it is "specially suitable" for "driving electric generators." Why is it never used for this purpose on any considerable scale?

Mr. Wollaston, in the chapter on water service to power plants, deals adequately with the lime-soda and base-exchange systems of water softening. We miss some reference to the interesting process of removing salts and other impurities from water by colloidal action.

The subject of fuel economy on ships, treated by Mr. Williamson, is peculiarly important to Britain. It is, for instance, of the greatest importance that bunker coal, which is perhaps the only coal the export of which is profitable to Britain, should be used with as little waste as possible. Oil fuel is dismissed as of little importance to this country. We agree; but we are sure that where oil fuel is to be used under boilers, the furnaces and combustion chambers must be specialized, and that the optimum results cannot be obtained where boilers are "equipped for burning either coal or oil." The water-tube boiler, already practically supreme in the Navy, coupled with mechanical stoking, is indicated as the best means of obtaining coal economy in the mercantile marine. The proposal to use pulverized coal is also discussed. We believe, however, that the Diesel engine is becoming more popular at sea. The chapter concludes with a very interesting description of the machinery of "the economical steam-driven cargo vessel."

Mr. Poultney's chapter on the use of fuel in the locomotive boiler is strictly confined to the British point of view, and concludes with an excellent summary and a useful list of references. It would be interesting to know what is meant by saying that a particular coal is "hot." This is an excellent article, but we think it suffers from the same defect as most of the others. It is too specialized. What we want is a complete statement of the railway transport side of fuel economy in the country as a whole; and this involves a study of the possibilities of electric traction. We fancy it has been shown that the cost per ton-mile would be distinctly more if the present steam locomotive were replaced by electric tractors supplied from central stations. The extra cost, however, might be justified if it could be shown that a considerable economy in good-quality fuel could be effected. At any rate, we think this is a problem which should have been fully dealt with in this book.

This section of the book concludes with five chapters on boiler plant auxiliaries, an article on progress in pulverized coal firing, and a short but very useful article by Sir Philip Dawson in general terms on national electric power production.

The use of superheated steam has produced notable fuel economies in all classes of steam plant, and we imagine that its adoption is to-day pretty well universal. The economizer or feed-water heater is also a constant feature of all modern steam plants, even those of small dimensions. Mechanical draught is necessary to maintain a correct balance of pressure conditions in the elaborate boiler systems of present-day practice, but dust collectors are necessary if the intense concentration of fuel-burning plant is not to prove as great an evil as the smoke nuisance itself.

The article on pulverized coal is good and extremely practical from the purely technical aspect. But again we miss the British point of view. What is the smallest power station to which this system of combustion can be economically applied? What number of stations of this size and upwards is likely to exist in Britain? What will be the economy of fuel effected both absolutely and in relation to the total requirements for the generation of electricity? These are the questions which really interest us.

* Published by "The Fuel Economist," price £2 2s.

The second portion of this part of the book deals in a thorough manner with the use of fuel in iron and steel works practice. The importance of this aspect of fuel economy is undoubted, but its problems are peculiar, and cannot be adequately criticized except by specialists within the industry. As Mr. Evans points out in his excellent general survey of the question, if the British iron and steel industry uses proportionately more fuel than that of the Continent, it is because fuel has been cheaper in this country. And Britain, having been the pioneer, is naturally still working with plant in which full advantage of the results of experience has not yet been taken. The pinch of higher prices and keener competition should supply the corrective. In the following six chapters Messrs. Fletcher, Brooke, Sarjant, James, Armstrong, and Harvey each discuss one particular aspect of this branch of the subject, covering the use of fuel in the several types of furnaces and power production, the scientific control of the thermal side of iron and steel production, and the use of pulverized fuel in this industry. With regard to the supply of gas to open-hearth furnaces, it may be remarked that producers with mechanical grates seem still to be the exception rather than the rule in Britain, even in recently built plants. Surely it is not possible to obtain anything like constant quality gas from the fixed grates which we have generally seen in British steel works.

Mr. R. J. Sarjant's work on metallurgical furnaces is well known, and he gives an excellent summary of it here, with a useful list of references; but apart from bringing out the fact that gaseous firing is by far the most economical method of using fuel in this way, we do not see what it has to do with Britain's fuel problems in particular. Power production in iron and steel works, treated by Mr. James, is more directly interesting, because it involves the possibility of linking up the surplus power—and using stand-by plant for the generation of power—which could be turned into the general supply of electricity in industrial districts. Mr. James brings out the point that the gas engine is vastly more efficient than any combination of gas-fuel steam-raising plant and steam turbine for the development of power; in fact, he puts the figure at 2 to 1 in favour of the gas engine. No doubt still higher efficiency will be obtained by the addition of the combination of waste-heat boilers utilizing not only the heat discharged from the furnaces, but that from the exhaust of the gas engines themselves, with steam turbines. Mr. H. C. Armstrong's chapter pleads powerfully for the installation of the internal combustion engine in every modern iron and steel works; and the same arguments apply to any plant in which fuel is used in considerable quantity. The use of pulverized fuel in metallurgy will no doubt be greatly extended, but we question whether it is the best way of treating a bituminous coal. We saw recently a very fine new plant supplying a large foundry in the Midlands, but we were told that the economy realized was still a doubtful quantity.

Parts IV., V., and VI. deal with carbonization and the generation of gas and coke from coal, questions which are, perhaps, more largely in the public eye at the present day than at any previous time in the short history of coal as an industrial fuel. The processes fall essentially into three distinct classes—those in which coal is converted into coke for metallurgical purposes, with gas as a bye-product, those in which coal is distilled for the generation of gas for town supply, with coke as a bye-product, and those in which coke is gasified by reaction with steam or air or a combination of the two for the generation of low-grade gas for a variety of purposes. Descriptions of all these processes are here summarized by competent experts. Messrs. Mott and Roberts and Prof. Wheeler are acknowledged masters of the coke question, Messrs. Finlayson and Rhead and Dr. Parker are authorities on the question of coal gas manufacture for town purposes; gas-works coke is mainly in the competent hands of Messrs. Roberts and Nicol; the vexed question of low-temperature carbonization is in the hands of Dr. Lander; and Mr. Lymn has edited the part dealing with producers. These are just the principal names in a very full list of contributors.

Mr. Roberts is particularly interesting on the possibilities of blending waste fuels such as coke breeze and non-coking slacks with coking coals for carbonization, resulting in improved coke and assisting the process of dry distillation. The chapter is a useful summary of a portion of his recent book on "Carbonization."

Mr. Macleod's treatment of the subject of the bye-products of the coke oven process is short of figures; and here again there is no indication of any special aspects of the problem in Britain. The threatened extinction of the existing method of disposing of the ammonia in the form of sulphate, owing to the development of synthetic methods, is somewhat pathetically referred to. A few figures showing the relative costs of production would have been useful and illuminating. Mr. Rhead discusses the question from the different point of view of the gas-works, and shows that the gas industry must continue to get rid of ammonia in some saleable form, and losses on sulphate must be, at any rate for the present, regarded as an item in the cost of purification.

Mr. Finlayson's chapter on carbonization for town gas manufacture is a useful summary. He opens with an account of the development of the process, through intermittently charged retorts which still persist, to the continuous systems which now claim over 50 p.ct. of Britain's gas manufacture. The most valuable portions of this chapter are the tables quoted from recent papers by Mr. Thos. Hardie, the Chief Engineer to the Gas Light and Coke Company, whose experience of carbonizing systems must be greater than that of any other man living to-day.

Mr. Rhead's chapter has already been referred to. The following sentence, however, should be quoted, because it repeats an old truth, almost a platitude, which is somewhat ignored to-day. "The chief object of the gas industry is to make a combustible gas of suitable heating value, and sell it as cheaply as possible." And he very rightly approaches the question of bye-products from that point of view. Some bye-products must be converted into a saleable form because they are nuisances to be got rid of, and some must be sold at a loss for the same reason; but there is no justification for spending more money on the preparation and quality of a bye-product unless its value is thereby so increased that gas can be sold at a cheaper rate.

The receipts for bye-products per ton of coal might well have been compared with the receipts from the gas produced. Taking Mr. Rhead's figures (1925) and assuming a production of 75 therms per ton at 8d. per therm, the gas would realize 50s., as against 13s. 11d. for the bye-products; the original coal costing 24s. 1½d. Such a comparison shows that an increase in the quantity of the main product, gas, is vastly more important than an increase in the bye-products.

Dr. Parker, in his chapter on water gas and complete gasification, has a good deal of his own work to draw upon. The carburetted water gas plant is regarded as an indispensable adjunct to a large gas-works on account of the ease of starting it up and its convenience for dealing with surplus coke. To some extent its position has been undermined by the process of "steaming" in the continuous vertical retort systems; but its advantage as a balancing factor in production remains untouched. The addition of the waste-heat boiler has effected a notable increase in its thermal efficiency.

Mr. Hopkinson's chapter on the use of town's gas in industry shows that, in spite of its relatively high cost, its convenience and efficiency have secured its application in an increasing number of directions. No less than 42 p.ct. of the gas made in Coventry was used for industrial purposes in 1926, and the corresponding figure for Birmingham is over 20 p.ct. Fortunately the type of gas required is that which can be most cheaply produced; and Mr. Hopkinson shows that with skilled assistance in the design of furnaces and burners, and, most important of all, differential charges in favour of big consumers, this market can be almost indefinitely extended, to the great advantage of all classes of consumers and the public generally.

The economic aspect of low-temperature carbonization is dealt with by Mr. Bowater. He calculates that 30s. 7d. is the total value of the whole of the products obtained from a ton of coal by this method. It is to be compared with 69s. 2d. calculated on the basis of 8d. per therm from the results of high-temperature carbonization as given by Mr. Bowater.

From these receipts, of course, is to be deducted the cost of the fuel used in carbonization, which would not be less than 3 cwt. of the coke or its equivalent. This rough and incomplete comparison is enough to show the wisdom of Mr. Bowater's remark that the possibility of the substitution of the 40 million tons of coal now consumed in the domestic grate by some artificial smokeless fuel has "carried away many enthusiastic advocates of the process far beyond the limit warranted by technical progress already made." There are other considerations, too. On the one hand, a good proportion of the coal consumed domestically is unsuitable for carbonization, and, in the second place, the increasing volume of gas and coke used for domestic purposes has already achieved some of the desired results.

The peculiar properties of low-temperature tars are treated by Mr. Sinnatt not only from the technical aspect, but also from the point of view of the market. The extent to which low-temperature carbonization is going to contribute to the solution of our fuel problems depends upon the realizable value of the products evolved—and that in open competition with similar products obtained by existing methods. Already a few points may be regarded as definitely established. The smokeless solid fuel will not realize more than good household coal, probably a little less. Mr. Sinnatt points out that low-temperature tar will generally be not unlike vertical retort tar, and that, as 50 p.ct. of the tar now made comes from vertical retorts, and as such tars have proved of no definitely greater market value, the same position will be realized with regard to low-temperature tars. "The general trend," he says, "of the investigations on low-temperature tar suggests that the commercial value will not be greater than the average value of crude fuel oil and high-temperature tar." And he has collected together some extremely valuable and interesting information on this

point. Mr. Sinnatt's article would be the proper place for (and its value would be enhanced by) a brief comparison between low-temperature tars and high-temperature tars. Reference is made in previous sections (*e.g.*, Rhead, pp. 348-349) to the similarity between the constituents and characteristics of tars from low-temperature processes and those produced from continuous systems of carbonization. This might have been somewhat enlarged upon here by actual data, and reference might have been made to the marked dissimilarity between these tars and those produced in intermittent processes of carbonization. Stress should be laid particularly upon the considerably higher yields of spirit and fuel oils obtainable from low-temperature tars, and upon the large difference in the content of inert materials—mainly the so-called "free carbon"—in these two classes of tar.

Mr. Lymn uses the word "gasification" to cover those processes in which coal or coke is raised to a high temperature by the combustion of a portion of it while air or steam is passed through the incandescent remainder to form carbon monoxide and hydrogen largely diluted with nitrogen and with small quantities of other gases such as methane. The result is a large volume of gas of relatively low calorific value, but relatively very cheap per therm and suitable for many industrial purposes; and there is no solid residue except the ash or clinker. The bye-products are tar of relatively poor quality and ammonia in much larger quantities than obtained in any carbonization process. The gas producer is used in this country on a large scale by the steelworks to provide fuel for the Siemens-Martin type of furnace, and by the gas-works to provide fuel for retort settings and for the manufacture of water gas. Perhaps the least efficient are the producers built in connection with retort settings, and they consume high-grade coke which ought to be placed on the market. Manchester is going to try the interesting experiment at Partington of firing retort settings with gas generated in producers specially designed for the utilization of coke breeze. The main advantage of the producer is the comparative facility with which it can be applied to the gasification of low-grade fuels.

Several types of producers are briefly described, but we think the Tréfois machine, which is that adopted at Partington, ought to have been included. It is a very interesting machine working at low pressure, water jacketed, and capable of dealing with coke breeze from 1 in. to zero without screening—a performance which, we believe, is not attained by any other producer so far in use. Mr. Rickwood gives a careful study of the use of producer plant working in conjunction with boilers and steam turbines for the generation of power. The trouble with this means of utilizing low-grade fuels used to be the unsuitability of the boilers, but with the invention of the multitubular gas-fired boiler by Kirke, and possibly others, this difficulty has disappeared.

"Britain's fuel problems" are overshadowed, to a great extent, by "Britain's smoke problem." The 21 pages occupied by Dr. Margaret Fishenden on the heating of rooms are, therefore, by no means the least important portion of this book. She has elevated this subject from the phase of vague generalities to a scientific plane in her published work during the last few years. Her chapters are accompanied by extremely useful lists of authorities with numbered references in the text. The whole position is summed up in Chapter III. on "Costs of Heating;" because, while the fortunate few can regard convenience as the principal feature of a system of heating and cooking, to the many the cost will be the ruling factor, though cost may very well include more items than merely that of the fuel itself. Britain's great problem is the effective use of a dwindling coal supply; and the question of domestic heating and cooking should be judged also from that point of view—that is to say, other things being equal, that method of applying heat should be adopted which involves the least expenditure of coal, whether in the house itself, or in the gas-works, or in the electricity power house.

In his introduction, Sir A. Mond says: "It must not be forgotten that the amount of energy at present recoverable as power from fuel is relatively still only a very small amount—something like a quarter of the amount theoretically possible." What does not seem to be realized is that, though heat and mechanical energy are theoretically reciprocally convertible, there is, in any state of the art of which we can at present conceive, a tremendous loss, amounting to quite 75 p.ct., when converting from heat to mechanical energy or power. There is a further loss, though not nearly so great, when converting from mechanical energy (or what comes to the same thing, electrical energy) to heat. For this reason, any scheme for the use of electrical energy for heating purposes is fundamentally vicious. The obvious thing is to convert the potential chemical energy of fuel direct to heat as near as possible to the point of application and without the interposition of any mechanical apparatus such as steam turbine or dynamo.

Mr. Reber has brought together some of the data relating to waste-heat recovery in the gas-works, and other heat-using industries. The waste-heat boiler is probably the most convenient and efficient of all the methods of converting surplus heat into available energy; and several gas-works now raise the whole of the steam required for power and other purposes in this way. It is frequently possible to work furnaces at higher temperatures than would otherwise be economical if waste gases at high temperatures are not to represent total loss. It is further certain that the expenditure of capital on power production plant using surplus heat is one of the most profitable forms of investment.

Steam accumulation is a device which was proposed some years ago, and abandoned; it would be interesting to know why such a device, successful under present-day conditions, failed to make good thirty years ago.

The recovery of waste heat in exhaust gases from internal combustion engines is really a branch of the subject already treated by Mr. Reber. Commander Sillince evidently has in mind the case of the Diesel engine of the mercantile marine, which is, of course, very favourably placed to make the most of an economy of this kind.

The question of refractories and insulation is of considerable importance in the consideration of the fuel problem. The temperatures at which furnaces are operated are limited by the properties of the materials available for their construction; and the insulation of the structure is one of the most obvious means of preventing heat losses, which increase rapidly with working temperatures.

Mr. Lewis deals with the deposits of British refractories, which are principally in the form of fireclay and silica rock or sand. The former are generally conveniently situated above and below coal seams, so that fuel is readily available for the manufacture of bricks and shapes; but silica may be situated at a considerable distance from fuel supplies, though its superior refractoriness makes it worth the extra cost thereby entailed in the preparation of bricks, blocks, and tiles for furnace construction.

Mr. A. T. Green gives a convenient summary of his own recent work and that of other workers on the subject of refractories, their properties and failings. The best insulating bricks for furnace work appear to be those constructed of diatomaceous earth. The famous Möler deposits of Scandinavia are well known. Mr. Hubbard makes no mention of the deposit in Northern Ireland of similar materials which are now being worked up into insulating bricks for furnaces of all types.

The last section of the book deals with oil as a source of heat and power. Mr. A. H. Hayes shows at what remarkably low cost electricity can be generated in small plants actuated by heavy-oil engines. A small but not unimportant point which he does not deal with is the possibility of the oil engine in agriculture. An accurate investigation might show that power can be transported and applied to farm premises in this way at rates which would put the electric "grid" into the shade.

The advertisements at the end of the book are presented in the form of an illustrated supplement. Some 33 British firms have been allotted a page or two each on which to describe their standard productions; and this has been carried out in an unusually readable and interesting manner. It is, as it were, the contribution of Britain's manufacturers to the solution of Britain's fuel problems.

This is a big book, bigger than it would have been if the contributors had confined themselves to Britain's own fuel problem. We think that the several chapters on purely scientific questions should have been omitted; their place is in the text-books. As it is, the really valuable points are submerged in detail, and "Britain's problems" need a lot of ferretting out. The standard of English in the book is quite as low as is usual in this branch of literature. For example, "economy of fuel in producing power to drive a ship should be on an exactly similar basis as fuel economy in producing power on land" could be better expressed. Another specimen is: "Percentage yield of volatile per 100 grams of coke" (page 28)—especially as the word "coke" should be "coal." And one should not write of "a certain *amount* of thermal units; the correct word is "number." There are many indications of very hurried compilation, so that in several cases the same subject is treated over and over again by different contributors.

Seyler's classification of coal is treated in detail in the first chapter, and again in the ninth. There are at least two expositions of the theory of combustion; and the principles of carbonization are set out several times. Uniformity of nomenclature and units should have been insisted upon by the general editor. "Coking" coals are described as "caking" coals by some contributors. In one chapter the percentages of oxygen and nitrogen in the air are taken as 23 and 77, atomic weights are given to the nearest whole number, and then results are worked out to no less than five significant figures.

The proof-reading of so expensive a book should really have been better done. On p. 11 figures giving the volume of gas produced per ton of coal in certain American carbonizing plants have been multiplied by 2 and decorated with a meaningless "m." On p. 340, the calorific value of "18,181,810 B.Th.U. per gall." is too high even for vertical retort tar. And we marked a long list of errata besides.

PROF. TRAVERS' CHEMICAL STUDY OF PROCESSES INVOLVING THE CARBONIZATION OF COAL BY INTERNAL HEATING.

By HARALD NIELSEN.

There are a good many points of interest in Prof. Travers' controversial paper before the Institute of Fuel. It was my firm intention to attend that meeting, but Fate, in the shape of an attack of influenza and high fever, prevented me from grasping the significance of Prof. Travers' centigrade heat unit moles—at any rate, my doctor firmly forbade me to think of them. Now I am back to normal I am sorry I did not think of moles then—but this is by the way.

Prof. Travers did me the honour of mentioning my name; and I wish to state that I have always had the greatest admiration for his work. But why not adopt the straight metric system in heat technique, as we have done in chemistry? People abroad will be able to understand us much better, and our own friends in the gas industry who favour B.Th.U. Fahrenheit and grains per cubic foot can in every conversion table find the right factor for multiplication and division. We can then see things much more clearly. I have spent much of my life getting out thermal balances, but I have to think twice when I see a molar unit. The trouble is that the unit does not convey anything tangible to me; and I am afraid I am not the only one.

Now as to the carbonization by internal heat, or, as I prefer to call it, distillation. It is possible to sit down with paper and pencil, take the latest German coefficients, &c., and work out a beautiful thermal balance with or without moles; but there is always something or other which no amount of theory can account for. I had a shot at the same thing as Prof. Travers, and my article appeared in the "GAS JOURNAL" for Feb. 1, 1922. I know more about it now; but I found that I was not so very far out then. Prof. Travers proves that the water gas produced by gasifying the solid residue from one ton of raw coal is not able to carry more heat than that required to distil half-a-ton of coal. Hence complete gasification is nonsense. Nevertheless, the fact remains that there are many so-called complete gasification plants in this world; and coal is distilled and gasified. Figures can prove anything, or be made to prove anything. Coals are all different. For instance, coal of an oldish formation may require more heat than coal of a younger formation. Some coals are strongly exothermic once they are heated up to 300°-350° C. My assistant, Dr. Baker, and myself published in the "GAS JOURNAL" for Jan. 27, 1926, that we had found definite evidence of exothermic reactions in many bituminous coals at temperatures even below 200° C. This fact, which can easily be confirmed—and, in fact, has been later confirmed by the work of the Fuel Research Board—is quite enough to upset any calculation.

Other investigators have found, and confirmed by experiments, that the actual quantum of heat required for distillation of average coal is round about 2·5 to 3 p.ct. of the heating value of the coal. When high temperature practice is studied carefully, the same result will be arrived at. In figures, coal of 12,500 B.Th.U. per c.ft.—say, 7000 kg. cal. per kg.—requires from 300 to 375 B.Th.U. per lb., equivalent to (say) 165 to 210 kg. cal. per kg. This is the heat which actually has to get into the coal as such. Heinrick Kopper, the great coke oven constructor, maintains that 420 B.Th.U. is all he requires per lb. of raw coal to effect carbonization in his modern ovens. This amount includes radiation losses, &c. The exothermic reactions which become more pronounced the higher the carbonizing temperatures employed are also to blame for the fact that the fuel consumption for low and for high temperature plants are pretty much the same.

Take another example—a continuous vertical retort setting. Most makers guarantee a fuel consumption of 9 p.ct. by weight of the raw coal in form of coke. Take the calorific value of coke, weight for weight, as 90 p.ct. of that of the raw coal, and the producer efficiency as 75 p.ct. We have:

$$9 \text{ p.ct.} \times 0{\cdot}9 \times 0{\cdot}75 = 6{\cdot}1 \text{ p.ct. at the setting.}$$

Multiplying this by the combustion efficiency—say, 75 p.ct.—this figure is reduced to $6{\cdot}1 \times 0{\cdot}75 = 4{\cdot}77$ p.ct. Making allowances for radiation and convection losses, the 3 p.ct. as stated by me is not so far out. Now the volume of gas required to carry the necessary heat to distil 1 ton of raw coal is thus roughly:

$$\frac{1000 \text{ kg.} \times 210 \text{ kg. cal.}}{0{\cdot}3 \times 600^\circ \text{ C.}} = 1050 \text{ cub.m. at N.T.P.,}$$

(about 0·3 being the specific heat of the heating gas per cub.m., and 600° C. being the drop in temperature of the gas) or, in all, 37,000 c.ft. of gas.

Maclaurin states that he found that about 30,000 c.ft. were wanted in his process; and I think he was not far wrong.

My own experience goes to prove that about 40,000 c.ft. of gas is ample to carry the necessary heat for coals containing up to 5 p.ct. of moisture.

Say 70,000 c.ft. of water gas at N.T.P. are made per ton of coke, and 0·6 ton of coke is produced per ton of raw coal—$70{,}000 \times 0{\cdot}6 = 42{,}000$ c.ft., *plus* unconverted steam. We then have a sufficient volume of heat-carying gases to do all we wanted to do; and that is why complete gasification plants and processes work—at any rate, some of them.

If there had been any doubt in Prof. Travers' mind, he might have thought of augmenting the volume of water gas by employing a circulating gas system, and only removing from the circle the surplus gas made (how much or how little that may be), and everything would have been in order.

UTILIZATION OF TOWN REFUSE.

In a paper which he read before the Institute of Fuel on Jan. 11, Mr. ARTHUR B. SCORER considered the question of the disposal of town refuse, with special respect to its fuel value.

Tracing the development of refuse destructors from the earliest times, and showing how they grew from being extremely inefficient plants to those having great steam-raising possibilities, he came to the revolution which was made in the design of refuse destructors in England by the invention of the Meldrum continuous grate. In this design all walls between the grates were swept away, and the grate was made in one continuous length. They were made in units of four grates each, usually either 25 or 30 sq. ft. area. In addition, the very efficient system of steam jet forced draught which had been used by this firm on forced draught furnaces and mechanical stokers was applied to the destructor. This put the refuse destructor on a higher plane of service altogether; and instead of its being merely the means of getting rid of considerable amounts of refuse in an extremely inefficient manner, it enabled useful steam to be generated. The refuse was burnt in a sanitary and efficient manner, and good hard clinker obtained. At this time electricity works were being put into use; and as they were on a small scale, steam provided by refuse destructors formed a very considerable portion of the total requirements. The first installations on the Meldrum continuous grate system were put in at Darwen, Nelson, Hereford, Rochdale, Preston, Burnley, Ayr, Stoke, and Cleckheaton. Many of these were at electricity works.

Results obtained on various tests indicated that about 2 lbs. of steam were obtained per pound of refuse, and that over 100 units of electricity per ton were generated in plants of moderate size. In this connection, the author pointed out that the refuse of twenty years ago was much richer in steam-raising constituents than it is to-day. The development of gas fires and gas cookers has eliminated a lot of the cinders; and the fuel value of town refuse has decreased, especially in the summer months.

Mr. Scorer described the methods that have been adopted on the Continent to deal with refuse, and then, returning to English conditions, remarked that, after the development of the continuous grate, the general design was not altered for some years. The shaft type of furnace of Didier has recently been developed in this country by Messrs. Woodall-Duckham. An installation of this type has been put down by the St. Marylebone Borough Council. The plant on test burned at the rate of over 500 lbs. per sq. ft. grate area, and gave an evaporation of 1·32 lbs. of steam per pound of refuse.

The main consideration in these schemes is to find a permanent market for the salved materials at a paying price, and to enable the work to be done at the lowest possible labour costs in a sanitary manner. If the corporation concerned have a number of boilers under their control, where a continuous outlet is provided for the cinders, a good balance-sheet can be made out for the process. It has, however, to be borne in mind that an outlet must be provided for the dust. This is quite innocuous; but if there is not a tip handy, considerable expense has to be incurred in removing it. The dust will amount to about 40 p.ct. of the total weight of the refuse. The cinders will total some 35 p.ct. in winter, and may go down to as low as 20 p.ct. in summer; the calorific value being about 8000 B.Th.U.

At Woolwich there are installed three four-grate units of the Meldrum front-feed type, having a total capacity of 240 tons a day. They burn on an average 120 tons a day of 16 hours with one unit standing. The steam from this plant is sold to a factory for £2000 per annum. A clinker utilization plant has recently been added there; and screening and asphalt plants

are installed. Bituminous carpeting is made from the clinker for 3s. 8½d. per superficial yard; whereas the cost if produced from bought stone would be 12s. per superficial yard. The necessary heat for drying and power is, of course, provided by the destructor plant. The boilers are of the Babcock & Wilcox type, having a heating surface of 1827 sq. ft. On test, an evaporation of 1·637 lbs. of water actual was obtained. The plant at the pumping station at Twickenham is equipped with two two-grate units with Lancashire boilers. With one working, 25 tons per day are burnt, and there is raised an average of 2 million gallons of water in 24 hours to a total height of 50 ft. The resultant clinker sells at 2s. a ton. This plant saves about 200 tons of coal per annum, and has an evaporation of 1·25 lbs. of steam per pound of refuse. An interesting installation is that at Bury St. Edmunds. In this case the refuse is burnt direct on large water-tube boilers at the electricity works, by means of the Meldrum forced draught system. The amount consumed last year was approximately 4250 tons of refuse; and 2654 tons of small coal and cinders. Since these furnaces were installed for dealing with the town refuse, the coal consumption has been very greatly reduced.

It is thus evident that there are many cases where valuable refuse is being thrown away, and frequently it is costing money to get rid of it, whereas with proper appliances this refuse can be turned to good account and money saved.

A REVIEW OF THE UNITED STATES GAS INDUSTRY.

Some Sterling Data as to Business and Prospects.

By OSCAR H. FOGG, President of the American Gas Association.

The gas industry faces 1928 with an overwhelming array of economic factors in its favour. Preliminary estimates of sales for 1927 reveal an increase of 20,000,000,000 c.ft. over the record-breaking total registered for 1926. The estimated 1927 figure is 475,000,000,000 c.ft., a new high record, proportioned as follows: 334,000,000,000 c.ft. for households, 135,000,000,000 c.ft. for industrial and commercial uses, and 6,000,000,000 c.ft. for miscellaneous purposes.

Again, as in the past, the use of gas for commercial and industrial heating applications continues to show phenomenal growth; the amount consumed in 1927 representing 28·4 p.ct. of the total sales of gas for all purposes, or an increase of 9,000,000,000 c.ft. Manufactured gas companies now serve 11,400,000 customers, representing an increase of 350,000 over 1926. Miles of main total 91,000, invested capital is $2,700,000,000, and gross operating revenue $520,000,000—an increase of $20,000,000 over 1926.

The manufactured gas industry has not reported a decrease in annual sales or annual gross revenue in the last 21 years. Sales have increased 352 p.ct. in 25 years, while the population of the country has increased only 50 p.ct. Total sales per capita have increased 70 p.ct. in ten years, reflecting a growth in sales per customer as well as an increased number of customers.

A development of outstanding significance during the year was the amalgamation of the Natural Gas Association of America with the American Gas Association, thus bringing into one national organization all elements of the gas industry in North America. The latest consolidated figures show annual sales to be 1,714,000,000,000 c.ft., customers served 14,731,000, and gross revenue $785,000,000. The trend from solid fuel to gas is showing increased momentum; and this year is expected at least to duplicate the record made in 1927.

OUTSTANDING DEVELOPMENTS OF 1927.

Household and industrial consumption of gas offers tremendous opportunities for further development, substantiated by figures gathered in surveys made during the year. One survey, covering nearly 8,000,000 homes in 2228 communities, showed that, while 75 p.ct. of all families living in places of from 5000 to 100,000 population and over have gas service, the percentage for the communities under 5000 is only 54. The gas appliances in actual use also show a comparable difference. In towns of 100,000 and over, 79 p.ct. of the families have gas ranges; while in towns between 5000 and 100,000 population, the percentage falls to 47·9. Long-distance distribution of gas, now under careful consideration by engineers, will enable the industry to reach the small towns not now on gas lines.

A survey of the nation's factories also revealed an additional heating load of more than 75,000,000,000 c.ft. awaiting the cultivation of manufactured gas plants. This available business represents a total possible sales increase of more than 36 p.ct., but does not take into consideration the newly-opened fields of house heating, refrigeration, incineration, and large volume water heating.

Mr. Samuel Insull, of Chicago, commenting on the theoretical potential market for gas, stated in October that the industry was supplying only about 2 p.ct. of the total heat requirements of the country. He said it was entirely possible for gas to replace 20 p.ct. of the bituminous coal now used, and 75 p.ct. of the anthracite and oil, all of which replacements would give a potential market sixteen times greater than the present total output. For strictly domestic use, he declared it was possible to develop a consumption of more than three times the present output of manufactured gas for all purposes.

RADIO AND AVIATION.

Two interesting innovations which attracted considerable comment during the year were the use of radio by a large gas company to warn customers of a temporary discontinuation of service and advise them what to do in the circumstances, and the decision of leading officials of the industry to render a distinct service to aviation by making gasholders serve as aviation landmarks. More than 1500 gas companies are prepared to mark their holders with arrows or other suitable direction signs.

The success scored by the American Gas Association Testing Laboratory, in Cleveland, in testing and certifying appliances for the gas-using public is a notable development. In a little more than two years the laboratory has tested and approved 6500 types of appliances. It is estimated that 50 p.ct. of the water heaters, 60 p.ct. of the space heaters, and 75 p.ct. of the gas ranges sold east of the Rocky Mountains in 1928 will bear the laboratory's seal of approval. Plans have been announced for the erection of a new and larger laboratory, thus evincing the gas man's appreciation of the growing importance of this service to the industry and to the public.

House heating installations of the central-fired type continue to sell readily. When supplemented by the hundreds of thousands of space heaters sold annually, the heating load now represents a sizable factor. So great is the use of gas for house heating in Chicago, for example, that a difference of 1° in the mean temperature causes a difference of 1,000,000 c.ft. of gas in the daily output for that city.

HEALTH OF GAS SECURITIES IS GOOD.

The high favour in which gas securities are held to-day is common knowledge. A survey made during the year showed that 259 gas and electric companies had sold 4,879,000 shares to employees and customers since the inauguration of the customer-ownership movement. One company published its annual statement in fourteen languages. Prediction was made that the broadcasting by radio of annual stockholders' meetings can be expected in the near future as a development of the large growth in the number of security holders.

An economic and engineering survey of the industry inaugurated last year has been continued under the leadership of the industry's best engineering talent. The information disclosed already shows a noticeable trend to coal gas manufacture rather than to other methods using oil, resulting in the problem of bye-product disposal becoming a much greater task than in the past. Indications for the future point to an even more marked trend away from oil. The use of oil gives minimum bye-products; while if all gas were made from coal the residuals would amount to from 50 to 75 p.ct. of the actual gas business transacted during a twelve months' period.

Three stackless factories erected in Cincinnati during the year served to emphasize the importance of modern gas service as an eradicator of smoke. The elimination of the stacks was made possible by the use of gas and electric service. In Boston, a thirteen-storey office building was equipped with central fired gas boilers as the sole heating medium. This is one of the largest installations of its kind in the world.

COAL IS NOT FUEL.

Leading gas engineers are now trying to disprove what has long been considered an almost axiomatic theory—that coal is fuel. The contention is that coal, which must for thousands of years remain the chief energy resource of the world, is an essential raw material from the social, scientific, and industrial viewpoints. Basing their conclusions on the fact that from 1815 to 1914 the white population of the world increased threefold, while the production of mineral fuels—coal, oil, and natural gas—increased 75 times, they foresee the time when the burning of raw coal will be prohibited.

"SUPER" PLANT DEVELOPMENT PREDICTED FOR NEAR FUTURE.

Giant gas plants situated at strategic points throughout the country where coal is easily available, and a network of gas mains distributing clean gas at high pressures over long distances, is, it is believed, an accomplishment of the near future. Already sufficient knowledge is at hand to prove the practicability of this endeavour. Two gas mains from Ohio to West Virginia, 300 miles long, distribute natural gas at relatively high pressure. Another natural gas line, now under way, will be 450 miles long, and will pass gas at 450 lbs. pressure.

GAS BILLS FOR 1928.

(*Continued from p. 92.*)

LLANDUDNO URBAN DISTRICT COUNCIL.

In an Omnibus Bill to be promoted by the Council there are about twenty clauses which have special reference to their gas undertaking. They are in the main on model lines, and confer up-to-date powers in various respects. The clause extending to all cases in which a supply of gas is no longer required the power of the Council to enter premises carries the provisos that any person having control of such premises and not permitting entry shall be liable to a penalty not exceeding £5, and that unoccupied premises may be forcibly entered after 48-hours' notice. The clause giving power to compel repairs in case of danger is included, and also that authorizing the establishment of showrooms. The provisions of section 59 of the Rating and Valuation Act, 1925, relating to the sending or service of demand notes, shall apply to demand notes for any charges made in connection with the gas undertaking. The Council are to keep separate accounts relating to their several undertakings; and they may create an accident fund, to meet claims upon them—£20,000 being suggested as the amount at which the fund should be maintained.

[*Parliamentary Agents: Messrs. Lees & Co.*]

LONDON COUNTY COUNCIL (GENERAL POWERS).

A General Powers Bill of the London County Council provides that Part II. (Sale of Coal) of the Weights and Measures Act, 1889, shall, in its application to the county, extend to coke as well as to coal; and the Weights and Measures Acts, 1878 to 1926, shall be construed accordingly.

> If in the county any person who sells coke or who has coke in his possession for sale or any person in charge of any vehicle from which coke is being sold or offered or exposed for sale wilfully damps the coke for the purpose of increasing its weight or wilfully does any other act by which the purchaser of the coke is, or may be, defrauded, he shall be liable for every such offence, on the first occasion to a penalty not exceeding £5, and on the second or any subsequent occasion to a penalty not exceeding £10.

[*Parliamentary Agents: Messrs. Dyson, Bell, & Co.*]

MIDDLESEX AND SURREY (THAMES BRIDGES).

Among the works for which the Middlesex County Council and the Surrey County Council seek authority by their joint Thames Bridges Bill is the erection of a bridge over the river with approaches thereto in the urban districts of Hampton and East and West Molesey. When this has been completed and is open for traffic, the Councils may remove the existing Hampton Court Bridge, and stop-up so much of the approaches thereto as is rendered unnecessary by the carrying-out of the new work. Other bridges are to be (1) in the boroughs of Twickenham and Richmond and in the urban district of Heston and Isleworth, and (2) in the urban districts of Barnes and Brentford and Chiswick. It shall not be lawful for any person to enter upon, break up, or interfere with these bridges, or Richmond Bridge, which is to be taken over, or the carriageways or footways over them, for the purpose of executing any work, except with the consent of the Councils in writing, and "in accordance with such terms and conditions, either as to the payment of any rent or other valuable consideration or otherwise, as the Councils may reasonably determine. Provided that the owners of any mains, pipes, or other works, lawfully placed in the existing Hampton Court Bridge shall be entitled to place, maintain, and renew similar mains, pipes, or works in the bridge which is to replace it, upon such terms and conditions as may be agreed upon. The Councils shall give to the owners reasonable facilities for placing such mains, pipes, lines, and works in the last-mentioned bridge before the existing Hampton Court Bridge is demolished.

[*Parliamentary Agents: Messrs. Sharpe, Pritchard, & Co.*]

ROTHERHAM CORPORATION.

Among the provisions of a General Bill, the Corporation seek the application to the sale of coke of the Weights and Measures Act, 1889. The clause creating a penalty on fraudulent sale is in the following terms:

> If any seller of coke, or any person in charge of any vehicle from which coke is being sold or offered or exposed for sale, wilfully makes any false statement as to the weight of the coke in any sack, or wilfully increases such weight by damping such coke, or wilfully does any other act by which the purchaser of the coke shall be defrauded, he shall be liable for every such offence on the first occasion to a penalty not exceeding £5, and on the second or any subsequent occasion to a penalty not exceeding £10.

One of the sections relating particularly to the gas undertaking reads:

> Notwithstanding anything contained in the Acts relating to the Corporation and their gas undertaking, or in any agreement thereunder, they shall not be under any liability for a failure to supply gas in accordance with the provisions of those Acts or such agreement in cases where such failure is in consequence of the failure on the part of the person who had contracted with the Corporation for the supply of gas to them to furnish such supply or of his supplying gas which is not in accordance with the contract or where such failure of the Corporation is due to circumstances beyond their control.

[*Parliamentary Agents: Messrs. Sharpe, Pritchard, & Co.*]

SOUTH METROPOLITAN GAS COMPANY.

The limits of supply of the South Metropolitan Gas Company adjoin those of the Wandsworth, Wimbledon, and Epsom District Gas Company; and it has been agreed between the Company and the Wandsworth Company that a small portion of the limits of supply of the latter Company can be more conveniently and economically furnished with gas by the South Metropolitan Company. The South Metropolitan Company have executed certain works and have been affording certain supplies of gas in the area referred to; and the Bill seeks the extension of the Company's limits of supply and the confirmation of the execution of the works. The proposal is to extend the Company's existing limits of supply so as to include a small area in the borough of Wandsworth and the urban district of Mitcham mainly bounded by the Southern Railway and the boundary between the counties of London and Surrey. Power is asked to issue additional capital (in ordinary or preference stock) to an amount which, after taking into acccount any premiums or discounts, will not exceed £1,000,000, and to borrow up to one-half of the additional capital raised and one-half of the capital already issued. Preference stock and debenture stock to be created may be redeemable.

By the Company's Act of 1920 it is provided that (except as is by the Act otherwise provided) they shall not in any one year declare any larger dividends on the ordinary stock than at the rate of 5 p.ct. on stock issued before the passing of that Act and for the time being paid up, and a dividend at the rate of 6 p.ct. on stock issued after the passing of the Act. The Company have not since the passing of that Act issued any ordinary stock; and they are of opinion that it would be of advantage that they should be able to issue capital which they may hereafter issue as stock of the same denomination as the existing ordinary stock of the Company. Therefore the provisions of the 1920 Act are being amended. Any preference capital may bear such a rate of interest as the Directors shall determine at the date of issue. The following section refers to the issue of stock:

> *As to Mode of Issue of Stock or Debenture Stock.*—(1) All stock or debenture stock created under the powers of this Act shall, except so far as is otherwise expressly provided by this Act or by section 11 (Company may issue redeemable preference stock or redeemable debenture stock) of the Act of 1916, be issued in accordance with the terms of section 10 (as to mode of issue of stock or debenture stock) of the Act of 1916 as amended by this Act.
>
> (2) The provisions of the said section 10 shall not apply to any stock issued—
>
> (*a*) for the purpose of any co-partnership scheme of the Company; or
>
> (*b*) for the purpose of complying with any provisions contained in any agreement made under the Act of 1925 between the Company and any other company authorized to supply gas under parliamentary powers and approved by the Board of Trade as required by the provisions of that Act;
>
> and the Directors may, without any other authority than is given by this section, issue any such stock which may be required for either of the said purposes.
>
> Provided that any stock issued for the purpose of any such co-partnership scheme shall be issued at as near as may be the average market price of such stock in the period of two weeks immediately preceding the issue thereof, and that in no case shall the price at which such stock shall be issued be lower than 5 p.ct. below such market price, and that to ascertain the average market price of the stock for the purposes of this sub-section the mean daily prices recorded in the London Stock Exchange daily official list shall be taken for the said period of two weeks.

The Company may subscribe for, purchase, hold, and dispose of shares, stock, or securities in any company with whose proprietors the Company may be authorized under section 6 (loans to other companies and exchange of securities) of the Act of 1925 to exchange stocks, shares, or securities.

Clause 21 reads:

> *For Prevention of Improper Use.*—(1) If any person supplied with gas by the Company uses or deals with the same so as to interfere unduly or improperly with the efficient supply of gas by the Company to any other person, the Company may, if they think fit, cease to supply gas to such first-mentioned person.
>
> (2) Any person supplied with gas by the Company who wilfully uses the same for a purpose other than the purpose for which

the same is supplied shall be liable to a penalty not exceeding £5, and to a further penalty of £5 for each day on which such offence is continued by such person after conviction therefor.

[*Parliamentary Agents: Messrs. Sherwood & Co.*]

SOUTH SUBURBAN GAS COMPANY.

This is a Consolidation Bill, which begins by defining the limits of supply of the Company and providing for the repeal of certain Acts and provisions. The capital of the Company is £1,914,477, of which £1,243,795 has been issued as ordinary stock (the premiums amounting to £14,510). There remains unissued £656,172; and it is provided that this may be issued either as ordinary or preference stock—the latter to bear such a rate of interest as the Directors may determine. Then follow the clauses relating to the issue of new ordinary or preference stock, which stipulate that:

All ordinary stock or preference stock so to be issued, whether the same be at a premium or not, may (with the approval of the Board of Trade, to be signified in writing under the hand of an assistant Secretary of that Board), if the Company think fit, be offered to all the gas consumers and persons in the employ of the Company. The price at which the said preference stock shall be so offered shall on the occasion of the first issue of the same or of any part thereof be such as shall be determined, on the application of the Company, by the Chairman of the London Stock Exchange; and on the occasion of any such issue of ordinary stock or of any subsequent issue of such preference stock, the price at which the same shall be so offered shall be as near as may be the average market price of such ordinary stock or preference stock in the period of two weeks immediately preceding such offer (provided that in no case shall the price at which such ordinary stock or preference stock shall be offered be lower than 5 p.ct. below such market price), or if (as regards either of such stocks) there be no such market price, then such a price as shall be determined as hereinbefore provided. To ascertain the average market price of the ordinary stock or preference stock for the purposes of this sub-section, the mean daily prices recorded in the London Stock Exchange daily official list shall be taken for the said period of two weeks.

Any ordinary stock or preference stock which has not been so offered as aforesaid, or which has been so offered and not taken up, shall, before being offered to the holders of any ordinary stock or preference stock of the Company, be offered for sale by public auction or tender in such manner, at such times, and subject to such conditions of sale as the Company shall from time to time determine.

Any stock which has been so offered for sale and is not sold may be offered at the reserve price to the holders of stock of the Company, in accordance with the provisions of sections 18, 19, and 20 of the Companies Clauses Act, 1863, and to the employees of the Company and to the consumers of gas supplied by the Company, in such proportions as the Company may think fit, or to one or more of these classes of persons only. Provided that in the case of an offer to holders of stock if the aggregate amount of stock applied for shall exceed the aggregate amount so offered as aforesaid, the same shall be allotted to and distributed amongst the applicants as nearly as may be in proportion to the amounts applied for by them respectively.

The provisions of this section are not to apply to stock issued for the purposes of any co-partnership or profit-sharing scheme of the Company, or for the purpose of complying with the provisions of any agreement made between the Company and the South Metropolitan Gas Company under the South Metropolitan Gas Act, 1925. Borrowing powers are asked up to one-half the amount (including premiums) of any ordinary or preference stock issued after the passing of the measure. Preference or debenture stock to be issued may be redeemable.

The calorific value of the gas is to be 500 B.Th.U., with power to vary on due notice being given; and the basic price is to be 11½d. per therm, with a basic rate of dividend on the ordinary stock of 5½ p.ct. The surplus profits of the Company are to be divided in the proportions of three-fourths to the consumers and one-fourth equally between the ordinary stockholders and the employee co-partners of the Company. As from July 1, 1928, until June 30, 1929, the price in the urban districts of Bexley, Crayford, and Erith is not to exceed by more than a halfpenny the charge for the time being in the remainder of the limits of supply; and in respect of the twelve months from July 1, 1929, the difference is to be not more than a farthing. Thereafter the price is to be the same throughout the Company's district. As to public lamps, the Company are not to charge a higher price per therm for gas supplied to any local authority than the lowest rate from time to time charged by them to any private consumers in the district supplied by the Company. The following conditions relate to the basic price:

Provisions relating to Basic Price.—(1) The Company shall from time to time file for public inspection with the local authority and with the Board of Trade statements of the conditions under which they are prepared to grant discounts on prices charged by them. Any such discounts granted by the Company shall be alike under the like circumstances.

(2) No sum shall be (1) divided in excess of the basic rate or carried to the reserve fund and (2) paid to the co-partners in respect of any period in which the price charged to the ordinary consumer is more than a halfpenny per therm in excess of the basic price.

(3) The Company shall in each year send to the Board of Trade, with the accounts required under section 15 of the Act of 1920, a statement showing the number of therms sold at each of the several net prices during the year to which the accounts relate (including gas supplied to public lamps), and if thereafter requested by the Board shall also furnish to the Board all such other information relevant to the said matters as the Board may require.

(4) The accounts of the Company for each year shall contain such particulars as will enable the local authority to calculate the amount which may be for such year (1) paid as dividend or transferred to the reserve fund and (2) paid to the co-partners.

The Company shall not later than in the session 1933 promote a Bill in Parliament proposing a revision of the basic price now fixed, or giving an opportunity for such revision to be made.

The number of Directors is to be not more than eight nor less than five; and there may be one or more (but not exceeding three) Employee Directors. No Director shall be disqualified from acting by reason of the fact that he has entered into a contract with the Company for the supply and consumption of gas. From and after the passing of the Bill, all mains laid by the Company in any street shall be laid at a depth of not less than 2 ft., unless otherwise agreed between the local authority concerned and the Company. The expression "street," however, shall not include a bridge. The right is included to specify minimum sizes and material for pipes and fittings; and (unless otherwise approved by the Company) every meter to be used in a new building or a building not previously supplied with gas, or in connection with a new or substituted pipe laid between the main and the meter, shall be placed as near as practicable to the Company's main, but within the outside wall of the building. There are clauses under which the Company may supply power gas; and there are protective provisions for the Kent County Council and other bodies. Agreements may be made under the following conditions:

Agreements with Neighbouring Companies.—The Company may from time to time agree in writing with any company supplying or having power to supply gas within or adjoining the limits of supply for determining the bounds beyond which the parties to any such agreement shall not supply gas without the consent in writing of the other party to such agreement; and thenceforth during the continuance of such agreement the portion of the parish, township, hamlet, or place beyond such bounds shall be deemed to be without the limits of the company which shall so have agreed not to supply therein, and every such agreement may from time to time be varied or annulled by the mutual consent in writing of the parties thereto.

The Company may enter into an agreement with the South Metropolitan Gas Company for the use of their landing-stage at East Greenwich for the landing and delivery of coals and other matters incidental to, and necessary for, the operations of the Company as a gas company. A schedule defines and extends the lands which the Company may utilize for gas purposes.

[*Parliamentary Agents: Messrs. Sherwood & Co.*]

BRITISH COMMERCIAL GAS ASSOCIATION.

Programme of Scottish District Conference.

The following programme has been arranged for the "B.C.G.A" Scottish District Conference to be held in the City Chambers, Edinburgh, on Friday, Jan. 27, under the presidency of Councillor Angus M. Gregorson, W.S., J.P. (Convener of the Edinburgh Gas Committee).

Morning Session.

11.0 a.m. Welcome by the Right Hon. Sir Alexander Stevenson, Lord Provost of the City of Edinburgh.
Address by Mr. F. W. Goodenough, C.B.E. (Executive Chairman of the British Commercial Gas Association), on "The Gas Industry's Contribution to Public Health."
Discussion to be opened by Councillor Angus M. Gregorson, W.S., J.P., and Mr. Alfred Procter (President of the British Commercial Gas Association).

1.0 p.m. Adjournment for luncheon, at the invitation of the Lord Provost, Magistrates, and Councillors of the City of Edinburgh.

Afternoon Session.

3.0 p.m. Public Conference.
Opening remarks by the President of the Conference.
Subject for discussion:
"Atmospheric Pollution in Relation to Health."
Address by Dr. Wm. Robertson, D.P.H., F.R.C.P. (Edin.) (Medical Officer of Health, Edinburgh).
Discussion to be opened by Sir Arthur Duckham, K.C.B., M.Inst.C.E., Councillor A. Gilzean (Vice-Convener, Edinburgh Corporation Gas Committee), and Councillor W. J. Harvey, J.P. (Member of the Edinburgh Corporation Gas Committee).

4.45 p.m. Adjournment for tea.

A Health and Hygiene Exhibition promoted by the Edinburgh Corporation will be held at the same time in the Waverley Market, Princes Street, Edinburgh.

The Ohio Gas and Oil Men's Association is now affiliated with the American Gas Association. The Ohio Association, which has a total membership of 1700, and is one of the most active state organizations in the country, is the sixteenth group to be added to the rôle of affiliated A.G.A. Associations by action of the Executive Board.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

North British Association of Gas Managers.—Institution of Gas Engineers' Examinations.

SIR,—The Council of the above Association desire me to request you to give space in the "JOURNAL" for the purpose of informing students in Scotland that the Council are prepared in certain conditions to grant assistance towards the payment of fees for Correspondence Classes in Gas Engineering and/or Gas Supply.

To qualify for such assistance, applicants must be so situated geographically that it is impossible for them to attend any of the recognized Technical College Gas Classes, and must also be fully qualified in the ancillary subjects appertaining to the grade of certificate for which they intend competing.

Applications, giving full particulars of qualifications, and amount of fees paid, or to be paid, should be addressed to me for submission to the Council.

DAVID FULTON,
Secretary.

Gas-Works, Helensburgh,
Jan. 10, 1928.

Glycerine and Its Properties.

SIR,—I do not propose to reply to your correspondent, Mr. Knowles, at great length. My authority for the figures on which the statements in my paper on Nov. 16 were based is Landolt and Bornstein's Physical-Chemical Tables. I have been able to consult an abstract of the "Journal of Industrial and Engineering Chemistry" to which he alludes in your last issue, which shows that the data therein are fully in accord with those in the above tables.

I conclude therefore that Mr. Knowles has made a considerable miscalculation which is of such possibilities as to vitiate the whole of his statements relative to the behaviour of glycerine as a gas-drying medium.

C. HARRIS.

Taunton Gas Light and Coke Company,
Taunton,
Jan. 13, 1928.

SIR,—We ask the hospitality of your columns to correct some statements made by your correspondent, Mr. Knowles, of Messrs. Kirkham, Hulett, & Chandler, Ltd., in your last issue, relating to the properties of glycerine-water mixtures.

We have examined the data he quotes from the "Journal of Industrial and Engineering Chemistry," and find them in exact agreement with those in other reliable tables. Our own direct determinations are also in agreement with these, and show that Mr. Harris's conclusions are correct.

There is, however, a grave error present in Mr. Knowles' calculations from the paper. The error is of about 100 p.ct. magnitude, and apparently arises from an assumption that the "Duhring Lines" are parallel lines, which they are not. If the calculation is made from the tables in the same paper by the prescribed method, the results quoted by your correspondent come out as follows:

Vapour Pressure in MM. at 54° Fahr.

—	Your Correspondent's Figure.	Actual Figure.
$CaCl_2$ solution, 77° Tw.	4·55 mm.	4·25 mm.
Glycerine 75 p.ct., water 25 p.ct. . .	3·04 ,,	5·80 ,,
,, 80 p.ct., water 20 p.ct. . .	1·92 ,,	5·1 ,,
,, 75 p.ct., with added salt . .	1·46 ,,	4·5 ,,

We would finally say that, in reference to the whole position, we have previously been aware of the many disadvantages of the use of glycerine, and do not consider it a practical medium for the absorption of water vapour.

For W. C. HOLMES & CO., LTD.,
D. M. HENSHAW.

Whitestone Iron Works and Turnbridge Foundry,
Huddersfield,
Jan. 16, 1928.

Why Not a Gas Chemists' Association?

SIR,—I have read with great interest the letter on the above subject appearing in the "JOURNAL" last week.

I personally have the greatest sympathy for the desire which exists that the chemists of the gas industry should have the chance of getting together, in order to discuss chemical matters relating to their industry. But is there any real necessity to form a new association? Surely the Fuel Section of the Society of Chemical Industry can serve the purpose which "Gas Chemist" has in mind. The Section is quite flexible enough to deal with this; and if there is a general feeling amongst gas chemists—namely, chemists engaged in the gas industry, the coking industry, the producer gas industry, &c.—that special treatment should be given to their subject, I should be glad to learn of it, and will bring the matter forward.

The formation of the Joint Fuel Committee, consisting of the Institution of Gas Engineers, the Coke Oven Managers' Association, the Society of Chemical Industry, and the Institute of Fuel, has for its main purpose the elimination of overlapping, and the combined discussion of mutually interesting subjects. This is the direction, I feel, in which the organization of Societies should go; and ultimately it may be that many Societies will come under one head, and each will be a section of the whole.

E. W. SMITH.

Allington House,
136, Victoria Street,
London, S.W. 1,
Jan. 16, 1928.

Fish Frying by Gas.

SIR,—We have read with interest Mr. Loughland's excellent paper on fish frying as reported in your issue for Dec. 28. Such papers constitute a valuable means of expressing the result of individual study and of effecting an interchange of ideas. I trust, therefore, that a few words of criticism will not be resented. The subject is of vital interest to the firm with which I am associated and to the entire frying industry. We are perhaps the only firm who have for many years specialized entirely in the construction of frying ranges using gaseous fuel only. It is hardly probable that the thirty installations from which Mr. Loughland presumably derives his experience would bring to light all the various problems and difficulties which a range maker must encounter. Service and supply should be fairly constant throughout any particular undertaking's area, but a range maker must make his appliances to suit all the different pressures and qualities of gas throughout the country. When this consideration is coupled with the uncertain factor of the consumer's individual flue arrangements, which, as Mr. Loughland says, "are rarely built specially for that trade," the problem is magnified indefinitely. We do not, of course, know to which maker Mr. Loughland refers as having stated that "it was the policy of all the range makers in the country to cut out brickwork entirely in the construction of gas-fired fish frying ranges." It must be about twenty years ago that my firm abandoned the use of refractories in favour of insulators. Many other range makers have recently realized the importance of this, and have followed suit. It would not be correct, however, to say that this policy is general.

Without the inclusion of oil bills in estimating the relative costs of frying by any particular fuel, gas as a fuel would still have many points to recommend it, but sales would undoubtedly be hampered by the fact that gas as a fuel is often many times as costly as coal. Mr. Loughland has probably never experienced the saving in fat or oil possible in an up-to-date gas range, for the very reason that he still favours refractories.

The system illustrated, fig. 1, is ingenious, but Table II. could be more useful if comparison were made between one particular burner—*e.g.*, the Davis—fitted to this firebrick setting, and the same burner with open base. After all, bar burners are not used to-day by any maker or fryer with progressive ideas. Our own research has, of course, taken us through these and other problems many years ago; but they have our constant interest and attention. We discarded the use of bar burners in 1919, which year marks the introduction by us of the original Davis self-intensifying burner to fish frying appliances. Since then, both we ourselves and Messrs. Davis have studied the fryers' requirements and effected great improvements in design.

Reverting to Table I. Tested results so tabulated are useful for the gas distributor's own reference, but the results so given must not be taken as representing what might be expected from really good and up-to-date plant. The best results shown would be totally inadequate to the average fryer. The most important, and probably the only reliable, test for efficiency is the water test. Other results given are complicated by the different grades of oil used, the water content of potatoes, &c., and the personal factor. It is also obvious that to test various burners under one standard pan is unfair unless the consumptions for which the burners are designed are identical; and in this respect Table II. does not conform with (Messrs. Davis's) Table III. It must also be borne in mind that the burner which will give the highest thermal efficiency under a given pan on test will probably be of too low actual power for the fryers' requirements. The true aim must be ample power combined with highest possible efficiency, and not the highest thermal efficiency irrespective of power required. Furthermore, we have seen burners of low thermal efficiency which through (probably accidental) good setting have given better results than highly efficient burners incorrectly set.

The problem facing the range makers is thus much greater than would appear at first glance. It requires specialized research which few gas undertakings can devote to the subject. We would therefore suggest that undertakings interested should test manufacturers' appliances complete, in preference to the components.

Regarding flues and flue temperatures, excessive heat of flue gases is utilized by means of our patented features to maintain the cooked foodstuffs in a hot and palatable condition. The temperatures quoted would rarely be found in a range so constructed. Previous reference has been made to the inadequate flues available. We have been called upon to vent ranges having up to 24 sq. ft. of pan area into flues 10 in. by 10 in.; and in some cases mechanical exhaustion has been employed.

The frying trade in the London area is in the majority of cases carried out on antiquated lines. There are, of course, exceptions; but most of the appliances in use would not be tolerated in the Provinces. The worst offenders are undoubtedly the solid fuel users. We have constantly endeavoured to impress upon gas undertakings

the importance of the potential load which they represent, and have pressed for closer co-operation between gas distributors and frying range manufacturers. Many of our friends among the gas distributors can now quote high percentages of frying appliances burning gas in their areas; and probably the most important step which could be taken to capture the balance would be elimination of special discounts for special appliances, and the substitution of a sliding-scale based on consumption alone. The average consumption of appliances manufactured by us during the last twelve months is 342 c.ft. per hour, which for a 25-hour cooking week gives an average of 8550 c.ft. per week for each consumer.

Most gas undertakings place exceptionally easy hire-purchase facilities before prospective customers, realizing that their interest lies not in the capital return on the appliance itself, but in the distribution of gas. Where gas undertakings do not see their way to grant these facilities, they can generally be arranged by the makers of the appliance.

I trust that these remarks will give some indication of the activities of manufacturers who consider themselves progressive, notably since the year 1919, and that they will perhaps suggest new lines of thought to those interested in the distribution of gas.

E. W. PROCTER.

"Triton" Works,
Huddersfield,
Jan. 16, 1928.

Re "Engineer" and the Two-Part Charge.

SIR,—The statutory form of revenue account showing the expenditure incurred in the production and distribution of gas may be divided for purposes of the present argument into:

1.—Manufacture.

2.—Distribution, management, and all charges not included in 1 and 3.

3.—Profit.

1A.—The total costs of manufacture depend on the cost of coal and the cost in wages of working the plant employed, and the upkeep of it.

2A.—The total charges under 2 depend on upkeep of mains, services, and meters, and the other charges concerned.

3A.—The total capital charges depend on the share and loan capital employed and the interest charged on it, &c.

The total costs per therm made depend on:

1B.—The total costs of 1A, less the cost of producing bye-products (not sold at less than cost) divided by the total number of therms produced. Note.—Where bye-products are sold for less than they cost, the difference must be added to the cost of manufacture.

2B.—The total charges of 2A, divided by the total number of therms made or sold.

3B.—The total charges of 3A, divided by the total number of therms made or sold.

The charges under 2B and 3B, it is clear, do not depend directly on an economical or low manufacturing cost, but on a good sale (a good average load) per unit of plant. *The cost of manufacture alone is the key to the selling price.* For this reason, such charges are considered as having nothing whatever to do with manufacture—they are for service, and service only. The essence of any two-part charge is one charge for gas and the other for service. So soon, therefore, as "Engineer" divides the service portion of the two-part charge by the therms sold to arrive at a figure for the cost of the average therm, he shows that he is missing the right road.

So far as Nuneaton is concerned, on the 1926 balance-sheet the charge to cover all standing charges, &c., exclusive of manufacturing costs, is actually 9·6d. per consumer per week; and this is how such a charge works out in practice, with a total sale of 334,000 therms:

A Possible Tariff for Nuneaton.

Therms Used per Annum.	Revenue at 4d per Therm.	Amount Overhead Charge at 9d. per Week.	Charge per Therm for Service.	Total Amount Revenue.	Total Price Paid per Therm.
	£ s. d.	£ s. d.	Pence.	£ s. d.	s. d.
30	0 10 0	1 19 0	15·6	2 9 0	1 7·6
40	0 13 4	1 19 0	11·7	2 12 4	1 3·7
60	1 0 0	1 19 0	7·8	2 19 0	0 11·6
80	1 6 8	1 19 0	5·85	3 5 8	0 9·85
102	2 0 0	1 19 0	3 9	3 19 0	0 7·9
200	3 6 8	1 19 0	2·34	5 5 8	0 6·34
1000	16 13 4	1 19 0	0 48	18 12 4	0 4·46

By the use of such a two-part charge, the selling price of gas for different quantities is adjusted automatically according to the quantity consumed.

When a service charge of 1s. per week is proposed, it is not for gas, it is for service. If the consumer uses 1 therm in a year, to say he pays £2 12s. for that therm is ridiculous. No sane man would pay £2 12s. a year for a therm of gas. He would, however, pay £2 12s. a year for having at his disposal such a gas service as herein set out.

That the combined charge for gas and service as at present made is an anomaly, is proved by the following example:

Assume that a man uses 1000 therms of gas a year, his service charge would then amount to 0·624d. per therm, while the man who only used 1 therm would pay £2 12s. for it. Therefore, to argue that the proposal in principle is one by which 10·6d. (or the corrected figure for 9d. per week) is charged per therm for service, is absurd. No consumer using over 50 therms a year—or 10,000 c.ft. per year of 500 B.Th.U. gas—pays it on the above tariff; and every domestic consumer with a family who uses gas for the purposes for which it can be economically used will take at least 500 therms a year. The extra charge over actual manufacturing cost to such domestic consumer would be only 0·93d. per week.

A flat rate charge per therm to bring in the same income compared with the above tariff is as different as cheese from chalk. Further, is it to be supposed that, with such a tariff in operation, sales of gas would not speedily double, with the result that all the higher rates (as well as the lower) would be halved?

How to Use Mains and Services to Greater Advantage.

Looking at mains and services, &c., alone, the average peak load throughout the year is probably something like three hours per day. This could be increased to nine hours or even more—in other words, six hours use daily of mains and services, &c., without any extra cost. Gas, therefore, for such increase in use, it is clear, might be charged at its manufactured price into holder without loss.

The distribution apparatus (such as governors and mains) is common to all consumers. The services, meters, and personal attention, which are by far the more costly part of the distribution system, are not common; for it is known that the smaller the consumer, the more he costs the undertaking supplying him. If every consumer used the same quantity of gas, then the matter would be different. Low-grade gas can be produced and sold for much less per therm than rich gas, and for this reason the distribution costs less money per therm. The determining factor is a commercial and not a mechanical one.

Usually the small consumers are in number in a ratio of about 3 to 1 of large consumers; and if the cost concerned with the service of the small consumer be added and charged to the large consumer, it causes his price to be prohibitive for many uses. This factor is one that keeps-back the use of gas not only in industry, but in its much more extensive field domestically. Small domestic consumers can afford to pay at least double (or even more) for gas than can the large domestic or industrial user; and even on these lines, it may be mentioned that the price of gas to domestic consumers where there is a good industrial load is always considerably less than where there is no industrial load at cheap rates.

There are all sorts of other considerations leading to the same conclusion as the foregoing. Whatever reasoning be applied, the outcome of it should be that it is beneficent to all concerned to make an annual charge to each consumer for the distribution and service, &c., of gas, including preferably the interest on the whole capital employed both for works and distribution, and then to give him gas at the cost price into holder, or something very near to it.

When the two-part charge as it can be applied is analyzed, it will be seen that its effect is that the cost of gas to the consumer may be but a small fraction over the cost of gas into holder! Is not this interesting? Where are all those people who have ridiculed the idea of gas being sold at 4d. per therm, on the ground that it costs most gas undertakings over 4d. per therm for the service?

I have taken 4d. per therm as the net manufacturing cost of gas at Nuneaton into the holder for 1927, which is a high figure. More than 200 therms per ton of good coal have been actually obtained over long periods; the coal costing 21s. 4d. per ton. If this cost is questioned, it can be dealt with as a separate issue.

The gas industry collectively, including "Accountant," does not appear to have recognized so far the work done by Nuneaton. Here gas has been gradually reduced over a period of years, until at the present moment it is being distributed of 200 B.Th.U. for all purposes. This quality has been in use for just over nine months, with every success. The cost of producing such gas, with proper equipment for its manufacture, is obviously considerably less than that of rich gas. What Nuneaton has sold, and is selling, 200 B.Th.U. gas for at the moment is of little consequence. Nuneaton makes 200 to 220 therms per ton of coal (at present costing about 20s. per ton), of a quality of 170 to 180 B.Th.U. If 500 to 600 B.Th.U. gas can be produced outside Nuneaton for 3d. per therm, or less money, then Nuneaton, for purposes of enriching 180 B.Th.U. gas (if it desires to enrich it), can produce it, under like conditions, at the same figure.

The cost of gas into holder at any works, if it is produced on anything like rational lines, should be a figure that cannot be materially reduced whatever the quantity of gas made may be. This does not, of course, refer to experimental manufacture. It must be admitted that the production of rich gas postulates coke production, and the cost of gas depends on the price obtained for the coke, every time. Do away with coke production as far as possible, and the cost of gas is reduced immensely.

So much for some of the principles concerned in the two-part charge. Now a few remarks on the effect of adopting them.

Present Method of Gas Production and Charge Wrong!

The present degree to which I advocate that the two-part charge should be carried is, I believe, original; and strange to relate, it will not appeal to many (if any) of the present leaders in the gas industry—for a very simple reason: With its adoption, the production of coke, together with rich gas, must cease, as can be demonstrated by figures much better than by words. Take the case of Glasgow, as all the figures have been recently published by the writer—and what is applicable to Glasgow is also of general application. (Glasgow has nothing to be ashamed of in its working.) In Glasgow, the charges as per 1926 accounts are as follows:

	Pence.
Net cost of gas into holder	3·45
Distribution and all other charges, excluding capital	3·44
Capital charges	0·50
	7·39

On a make of 47,000,000 therms, 3·94d. represents £771,583.

The number of consumers being 303,258, the annual figure for overhead and capital charges becomes $\frac{£771,583}{303,258}$ = approx. 1s. per week.

Therefore, consumers of 1000 therms per annum would pay:

	£	s.	d.
1000 therms at 3·45d.	14	7	6
Annual charge for service.	2	12	0
Total	£16	19	6

or 4d. per therm.

What would be the result of gas being offered to the Glasgow consumers on such terms? Can it be argued that the consumption would not almost immediately be multiplied by three? Anyhow, assume that it would be. As at present working, Glasgow handles 700,000 tons of coal and 300,000 tons of coke = 1,000,000 tons. For three times the gas, 2,100,000 tons of coal would be required, producing 900,000 tons of coke = 3,000,000 tons to be handled. Apart from the trebling of works plant, and very considerable capital charges, what would be the effect on the price of gas of an increased production of 600,000 tons of coke? Seeing that by the adoption of low-grade gas the consumer of Glasgow could have nearly three times the therms without any increased expenditure, I submit that no seriously-minded gas engineer could extend the production of gas on present lines of costly rich gas manufacture. If there is any other alternative than considerably lower-grade gas, now is the time for rich-gas advocates to speak. Coke competes with gas, and to aggravate this competition coke is sold at much less than its cost of production, and gas (at the present time) is in consequence sold at a much higher price than it should be sold at to make up the difference.

One other point. I state emphatically, but with great respect, to the whole gas industry that with rich gas of 550 B.Th.U. or so, the gas consumer (with the present pressure at which such gas is supplied) cannot obtain anything like the duty he is entitled to have. This can easily be put to proof; for if air were added to this gas, and its calorific value reduced to about 400 B.Th.U., the majority of consumers would obtain 20 to 30 p.ct. better duty—they would use 20 to 30 p.ct. less therms for the same work. Let those honest people who dispute this isolate a part of their district and try it—if they dare.

There is not the slightest doubt that gas produced and distributed by rational methods can be sold to large users at from 3d. to 4d. per therm to-day. The cost into holder is the key to the selling price, as I have always argued.

GEORGE HELPS.

Nuneaton,
Jan. 9, 1928.

P.S.—"Engineer" does not say that he has received the Glasgow pamphlet? In this pamphlet many more details are given than in this letter.

NOTE.—I should like to add to the foregoing letter that I do not accept blindly the figures of the net cost into holder as published by most undertakings for rich gas. Here are some of my grounds for this attitude:

1.—Why is it that the figures for the distribution, &c., outside manufacture at Nuneaton (which, of my own first-hand knowledge, I know are very high) compare quite favourably with larger and better-equipped undertakings? This is proved by the fact that, while a weekly charge of 9d. per consumer would easily cover all such charges in Nuneaton's case, a much higher weekly rate would have to be charged by most other companies.

2.—Where do all the profits on the immense sale of appliances and on fitting work go to? Are they used in such a way as to reduce the net cost into holder?

3.—Why, if gas costs a London gas company 4¼d. per therm at the outlet of the works governors, has 4d. or 5d. per therm to be added to such a charge, when such gas only has to make its own free way through pipes for either 100 yards or 100 miles? It must be acknowledged that mains and services have a life of 50 to 100 years, and the meters are paid for by a hire charge. Charges could be adopted by gas authorities whereby the selling price to all large users would be something within a fraction of the net cost into holders. If this is admitted, the importance of a small difference in the cost per therm is apparent; for one-fifth of a penny per therm represents about 5s. per ton of coal on an equivalent heat basis.

4.—How are the following present selling prices of gas to be reconciled?

	Per Therm.
Glasgow	1s. 1d.
Leeds	11d.
London	10d.
Bath	6d.

5.—The declared calorific value of gas by different undertakings shows the state of the industry so far as science is concerned.

Calorific Values.

4	gas undertakings	supply	375	B.Th.U.	gas and under.
16	,,	,,	400	,,	,,
191	,,	,,	400/450	,,	,,
216	,,	,,	500	,,	,,

and so on.

If rich gas is considered to cost so much less for distribution, why not make 1000 B.Th.U. gas? When Glasgow came down from 700 C.V., or so, to 470, did it find an increase or a decrease in distribution costs?

LEGAL INTELLIGENCE.

CHALK FUEL, POWER GAS, AND BYE-PRODUCTS CORPORATION.

Opening of the Trial at the Old Bailey.

At the Central Criminal Court, on Monday, Jan. 16, before the COMMON SERJEANT (Sir H. F. Dickens, K.C.), the trial was commenced of Sir Charles Buckworth Herne-Soame (63), solicitor; Robert George Harley (59), secretary, and Lieut.-Col. Edmund Octavius Eaton (65), engineer, who were charged with having, on dates between 1914 and the present year, conspired together and with other persons to defraud such persons as might receive prospectuses and pamphlets issued by the Chalk Fuel, Power Gas, and Bye-Products Corporation, Ltd., and obtaining money from them by false pretences. They were also charged with inducing Directors fraudulently to publish false statements. The police court proceedings were fully reported in issues of the "JOURNAL" appearing during November and December last.

The prosecution was represented by Mr. PERCIVAL CLARKE and Mr. J. F. EASTWOOD; while Mr. J. P. VALETTA and Mr. M. H. SHEARD appeared for the defendants.

CASE FOR THE CROWN.

Mr. PERCIVAL CLARKE, in opening for the prosecution, said that the accused were charged under section 84 of the Larceny Act of 1861. The Crown's case here was that statements were made in prospectuses and in circulars by the three defendants which were untrue, and which had as their object the inducing of people to become shareholders in a certain company. Two of the defendants were Directors of that Company. Col. Eaton, the other defendant, was not a Director; but there was evidence to show that he associated himself with the Company. He was largely concerned in directing its operations; and while he might not be charged as a principal, he was charged with aiding and abetting. The allegation here was that a conspiracy existed among a number of persons from the time of the inception of the Company until 1926; and evidence would be called to show that the defendants did, in fact, induce people, by statements which were untrue, to subscribe for shares in the concern mentioned. The Company was registered on March 6, 1914, with a nominal capital of £16,000, divided into 60,000 preference shares of 5s. each and 20,000 founders' shares of 1s. each. The registered offices were at 115, Cannon Street, and there were three Directors, their qualification being the holding of 50 shares each. The remuneration was £150 per annum each, with £200 to the Chairman, in addition to which there would be travelling and other expenses allowed.

Of the fully-paid preference shares, 28,000 were allotted to the vendors, among whom were included a Mr. Pearson, an engineer, a Mr. Wallace, a consulting engineer (each of whom were allotted 8000 shares), and also a Company known as "Sudine, Ltd.," a concern of which the defendant Herne-Soame was a Director. That Company had been incorporated in 1911 and sold its interests to the Chalk Fuel Corporation for 4000 preference shares. After the sale of its property, Sudine, Ltd., went out of existence. Col. Eaton had taken a marked interest in the property of Sudine, Ltd., which concerned itself, as did the Chalk Fuel Corporation, in the making of briquettes, which were designed to take the place of coal. In 1914 Col. Eaton busied himself in the obtaining of a report upon the substitute, with a view to this report being introduced into some prospectus. A Mr. Franklin, an engineer, agreed to carry out a number of tests of the fuel; and later Col. Eaton discussed the matter with Mr. Franklin. The prospectus which later made its appearance spoke of "Britain's New Fuel Field," and went on to say that the Chalk Fuel Corporation had been incorporated to exploit and work certain inventions and secret processes for the production of a cheap fuel. The basis of the new fuel was chiefly chalk and cinders. The chalk was manufactured by a secret process, and blended with a rich carbonaceous material, and finally moulded into briquettes for domestic and industrial uses. Another heading in the prospectus was "Cheapness, Considerable Heating Power, Burns Longer." A further paragraph was to the effect that, with efficient machinery the cost of production, including raw material and labour, would not exceed 15s. a ton, and the selling price would be from 30s. to 35s. a ton. The plant, it was said, would deal with an intended output of 100,000 tons of fuel in the first year, for which orders could at once be booked. The plant was estimated to cost about £30,000. Another prospectus had a photograph of a railway locomotive with which it was stated tests had been made; and a report dated Septemper, 1914, was given, saying that Mr. Franklin had carried out a trial with the chalk fuel, which might be considered as very important, in view of the difficult gradients over which the railway engine had had to travel. The fuel employed contained 70 p.ct. of chalk. The report also stated that, as soon as the Company was in a position to contract with the various railway companies, shareholders would benefit, and large profits would be made, which would enable the Company to distribute big dividends. These reports were quite untrue and misleading; but they got into the hands of persons all over the

country who wished to invest money. A test was carried out by Mr. Franklin on the Chichester and Selsey Bill Light Railway; but this was unsatisfactory, and the result was reported to Col. Eaton, who observed that he was afraid this report would not do for his purpose. Notwithstanding this, in pamphlets subsequently issued a report appeared purporting to be that of Mr. Franklin, who would now repudiate the report. Another circular was headed "Chalkoal;" and there was a sub-heading which read: "A Great Discovery. New improved fuel from chalk after years of experiment. England's new source of fuel and bye-products supplies." Photographs were given of excavated chalk ready for manufacture; and there was also an illustration of the machine for the manufacture of the briquettes. It was stated in a circular that a ton of briquettes at 25s. per ton was equal to 1¼ tons of average coal at 40s. a ton; and it was also claimed that a ton of fuel after it was burnt left a residue of 20 p.ct. of valuable ash. As a result of the circulars which were issued, various persons made applications for shares; but they had never received anything by way of dividend. All the money that was received had gone; and there was nothing left except debts.

THE EVIDENCE.

Mr. *Joseph Phillipson*, Manager of Messrs. Ruddock & Sons, printers, Old Jewry, said that he had found records of orders for printing received from the Chalk Fuel Corporation, and he produced four samples of circulars which his firm had printed. One was headed "Chalkoal Fuel—Promising Outlook;" and there was also a report of a meeting of shareholders. Witness said that 25,000 copies of each circular were printed; but they had not been paid for. One circular stated that the Directors had recently made a contract for the supply of 50,000 tons of fuel, and that as soon as the supply was available for sale the financial result should enable a very substantial dividend to be paid.

Another witness, named *Hill*, also a printer, stated that he had printed circulars for the Chalk Fuel Corporation.

Mr. *George Henry Franklin*, an engineer, gave evidence as to the tests of the fuel which he had carried out, and stated that these tests were unsatisfactory from the point of view of maintaining a proper head of steam.

The hearing was adjourned.

A CO-PARTNER'S DISMISSAL.

An application for the payment of a co-partnery allotment, amounting to £7 19s. 8d., was made at the Clerkenwell County Court on Monday, Jan. 9, by John Frederick Barber, of Alexander Terrace, Campsbourne Road, Hornsey, against the Hornsey Gas Company. Mr. DUNCAN was Counsel for applicant, and Mr. H. MURPHY appeared for the Gas Company.

Mr. MURPHY said the amount was not in dispute; the Company contended that the man was not entitled to the money.

The applicant said he was in the Company's service for eighteen months up to Nov. 12, 1924, on which day he was dismissed.

In reply to Judge Bairstow, he said that after being discharged he took no steps to bring an action for wrongful dismissal.

Answering Mr. Duncan, he said he was dismissed because he would not get up from his bed between midnight and 1 a.m., to look for a leak. He had been suffering from a bad cold for a week before, and had it for a week after he had to leave the Company.

His HONOUR said he was not trying the question whether the man had been wrongfully dismissed, but whether he was entitled to the money. On his own evidence he was dismissed, and if his dismissal was wrongful, and if, under the rules, it involved him in a loss of this £7 19s. 8d., that might have been included in the damages in an action for wrongful dismissal. As the man admitted he was dismissed, this was a mere waste of time.

Answering Mr. Murphy, the applicant said he was a member of a trade union at that time, and the officials said they could do nothing for him.

A copy of the rules of the co-partnership scheme was handed to the Judge, who read one of the rules to the effect that if any employee left voluntarily or was dismissed before he had been a certain time in the Company's service, any co-partnership allotment standing to his credit should revert to the ownership of the co-partners generally. The applicant, on his own evidence, had not been in the Company's service the stipulated time.

After further discussion, His HONOUR dismissed the application and gave judgment for the Company with costs. He refused leave to appeal, and remarked that it was a hopeless and ridiculous action.

ALLEGED FRAUDULENT SALE OF GAS ECONOMIZER.

Surbiton Hotel Keeper's Unsuccessful Defence.

In the Southwark County Court, on Jan. 9, before Judge MOORE, there was a claim by Messrs. Hodgkison & Co., of 33, Union Street, Southwark, S.E., gas engineers, against Mr. F. Sneesby, of the Victoria Hotel, Surbiton, to recover £8 9s. for a gas economizer supplied.

Mr. HENRY PHILLCOX appeared as Counsel for the plaintiffs, and Mr. DU CANN, Barrister, for the defence.

Mr. PHILLCOX said that the plaintiffs supplied the defendant with a gas economizer, and they guaranteed there would be a saving of between 10 and 30 p.ct. of gas. The contract further stipulated that the economizer would be tested, which was done in the presence of the defendant's son; and it was found there was a saving of 14 p.ct.

Mr. *Walter James Ormsby*, plaintiffs' traveller, gave evidence as to the signing of the contract, and the subsequent test before the defendant's son. The "Governor" economizer showed a 14 p.ct. saving of gas. He agreed, in cross-examination, that it took a definite number of heat units to cook a leg of mutton. They did not claim that the economizer added to the heat units, and thereby reduced the consumption of gas; but it regulated the flow of gas, and governed the pressure. He had not known or heard that any gas company had warned consumers against using these economizers. It would not be true to say that the passage of gas was arrested by the economizer so that it became necessary for the gas to burn longer to produce the same effect as it did before the fixing of the "Governor."

Judge MOORE: Is the same amount of heat produced in the same period?

Witness: Yes, I think so.

Mr *Fredk. Howell Hodgkison* said that the economizer was always adjusted when fitted to maintain a constant gas pressure. The flow was always irregular from the gas mains, owing to the varying loads—a fact which was admitted by all gas concerns. It was untrue to say that any warning had been issued against these economizers. In fact, the South Metropolitan Gas Company had purchased 2000, to supply to large consumers in their area. In cross-examination, he agreed that a definite quantity of heat was needed for boiling a kettle.

Mr. *F. Sneesby* stated that his gas consumption was heavy, and his sole object in fitting the "Governor" was to economize; but he found that it took much longer to cook his joints, and that no economy resulted.

Mr. DU CANN submitted that to sell the "Governor" as an economizer was a fraud, though it was perfectly legitimate to sell it as a regulator.

Judge MOORE said that the defendant had not proved his contention by producing expert evidence. He considered that the defence had failed to establish that no economy was effected; and he gave judgment for the plaintiffs, with costs.

MISCELLANEOUS NEWS.

PROGRESS OF BUENOS AIRES GAS SUPPLY.

Primitiva Company's Steady Recovery.

There was a meeting on Wednesday last, at Winchester House, Old Broad Street, E.C., of the holders of 4 p.ct. first debentures of the Primitiva Gas Company of Buenos Aires, Ltd., under the Chairmanship of Mr. P. A. COOPER. The purpose was the submitting of a resolution sanctioning an agreement made between the Company and the Spanish Electricity Company in Buenos Aires as to the disposition of moneys to be received from the Municipality in respect of the expropriation of certain property forming part of the security for the debentures.

The CHAIRMAN, in moving the resolution, pointed out that the Company in 1903 sold to the Electricity Company in Buenos Aires certain properties, and were to receive in payment £32,500 per annum until 1943. These payments were ear-marked for the service of the Gas Company's debentures. As security they had a charge on certain property, including that at present under consideration. Continuing, he said to the debenture holders: Shortly we shall receive on your behalf £109,000, to be paid over two years; and you will receive security in place of that expropriated. The matter is of importance to you. You have, in effect, the guarantee of the Electricity Company for the service of your debentures, and, in addition, the earning capacity of the Gas Company behind that; and if these proposals are given effect to, the rate of redemption of your debentures will be accelerated. I have the authority of the Trustees to say that they approve the resolution before you. I regret, however, to say that, whereas in order to carry the resolution it is necessary for £122,000 of the debentures to be represented at the meeting in person or by proxy, we have to date only £103,500; and, that being so, it will be necessary to adjourn this meeting for a week.

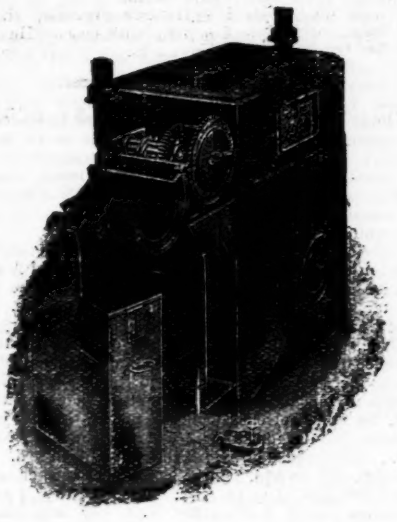
After he had made a strong appeal to debenture holders who had not already carried out the necessary formalities to do so without delay, a resolution adjourning the meeting for a week was agreed to.

At subsequent meetings of the holders of the 4 p.ct. consolidated debenture stock and the 4 p.ct. debenture stock (1911), at each of which the necessary quorum was present, the resolutions submitted were carried by the requisite majority.

CONGRATULATIONS.

Mr. H. T. MILLER said it must afford the debenture holders great satisfaction to note the recovery which the Company had made within the last few years. He proposed a hearty vote of thanks to the Chairman and Directors for the manner in which they had steered the undertaking through the difficulties which at one time surrounded it. With this vote he wished to couple the staff abroad, who must have put all their energies into the business in order to retrieve the position as they had done. ["Hear, hear."]

The CHAIRMAN, in acknowledgment, said that both he and his colleagues valued highly the appreciation of the proprietors. It would be a genuine pleasure to convey to the staff on the other side the congratulatory remarks that had been made. As the proposer had said, the undertaking was coming round steadily, and getting into a strong and healthy condition; and this was due to the untiring efforts of the General Manager (Mr. E. P. Stevenson), who was with them, and his staff in Buenos Aires.



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COAL TAR PRODUCTS IN 1924.

From the Third Census of Production (1924), Preliminary Reports, No. 30, Published by the Board of Trade.

Assembling together the output recorded by gas-works, by by-product works operated in connection with collieries and blast-furnaces, and by other establishments whose returns included an output of coal tar products, the aggregate production in the years 1924 and 1907, as returned to the Census Office of the Board of Trade, is shown in the following statement:

Coal Tar Products.	1924.		1907.	
	Quantity.	Value.	Quantity.	Value.
		£		£
Anthracene	86,000 cwt.	34,000	32,000 cwt.	10,000
Benzole	50,959,000 galls.	2,770,000	6,327,000 galls.	189,000
Toluole	673,000 galls.	56,000		
Carbolic acid (phenol)	140,000 cwt.	234,000	171,000 cwt.	171,000
	1,108,000 galls.	100,000	689,000 galls.	45,000
Naphtha	5,659,000 galls.	310,000	4,617,000 galls.	158,000
Naphthalene	325,000 cwt.	116,000	299,000 cwt.	45,000
Tar oil, creosote, and other heavy coal tar oils	88,947,000 galls.	2,720,000	66,712,000 galls.	702,000

All firms producing these goods were requested to return the quantities of their output in terms of the following standards:

Anthracene in terms of 40 p.ct. anthracene paste.

Benzole in terms of 50 p.ct. benzole liquid.

Toluole in terms of 90 p.ct. toluole.

Carbolic acid in terms of 60 p.ct. acid, expressed in gallons.

Naphtha and naphthalene in terms of crude naphtha and naphthalene respectively.

The greater part of the output shown for 1924 was expressed in these equivalents, but other standards were used in many cases, and the quantities given only roughly approximate to the aggregate production in these terms. In the census of 1907 the quantities of these products were returned without reference to any specific standard.

DIARIES, CALENDARS, &c.

In the last two issues of the "JOURNAL," we have acknowledged the receipt of several copies of the above. A few more call for mention.

Through their London Agents (Messrs W. R. Silk & Co., of Broad Street House, E.C.), the Clay Cross Company, Ltd., send us one of their useful pocket diaries. The Company is an ancient institution. Their first pits were sunk in 1838-9, and their first coke-ovens were built in 1840. As early as 1840, they were sending coal to London—partly by rail and partly by canal. Many gas undertakings know well the Clay Cross gas coals. Numerous productions of the Company, including tanks, pipes, and lamp-posts, are illustrated in the diary, which contains much other information useful to gas engineers.

The "Practical" year book and diary for 1928 is a production which fully justifies its title. It comes from Messrs W. G. Beaumont & Sons, the well-known painters of bridges, railway stations, gas-holders, generating stations, iron and steel structures, &c. The activities of the firm extend in many other directions, including constructional and demolition work, roadwork, main laying, &c. The large quarto pages of the neatly bound diary are interleaved with blotting-paper.

Messrs. Davison & Partner, Ltd., specialists in water-gas plants and waste-heat boilers, of 11, Carteret Street, Westminster, send us a wall calendar.

Another useful wall calendar has been received from Messrs. Brown & Tawse, Ltd., of 3, London Wall Buildings, E.C. 2. In the centre of each page it gives the dates for a complete month; and at the sides the dates for two years—ending with June, 1929, in the case of the pages referring to the months up to June; and then on those dealing with the ensuing six months, the complete calendars for two years up to Dec. 31, 1929.

CONTRACTS OPEN.

Overhead Siding.

The Gas Department of the Birkenhead Corporation invite tenders for the reconstruction of an overhead gas-works siding. [See advert. on p. 161.]

Retorts.

The Bakewell Urban District Council invite tenders for resetting a bed of retorts. [See advert. on p. 161.]

Stores and Materials.

The Works and Ways Committee of the City of Nottingham invite tenders for the supply of stores and materials. [See advert. on p. 161.]

Tar.

The Directors of the Slough Gas Company invite tenders for their surplus tar. [See advert. on p. 161.]

Maclaurin Fuel Oil and Gas Company, Ltd.—This Company has been registered in Edinburgh. The capital is £10,000 in £1 shares (5000 preference). The address is 150 Hope Street, Glasgow.

COAL TRADE REPORTS.

From Our Own Correspondents.

NORTH-EAST COAST.

Business during the past week has been fairly satisfactory, and colliery turns have, on the whole, been well booked for the rest of the month. There is, however, no disposition to trade very far ahead, buyers still apparently either mistrusting the labour situation, or hoping for reductions in prices. Local interests, however, do not anticipate any stoppage. They do, on the other hand, hope for some relief in production costs from the forthcoming negotiations; but these are badly needed to make up working deficiencies, and could not be regarded by collieries as a step to lower selling prices.

Gas makes are in fair request, and late quotations are maintained of about 16s. f.o.b. for Wear Specials, 15s. 6d. to 15s. 9d. for best qualities, and 13s. 3d. to 13s. 9d. for seconds. Durham unscreened coking is quiet at 13s. 3d. to 13s. 9d., and ordinary bunkers are plentiful at 13s. 3d. to 13s. 6d. Best unscreened steams ask 14s. 6d. to 15s. 3d., according to place of shipment. Gas coke is well sold, and makers ask 22s. 6d. to 23s. 6d. f.o.b. for shipment.

YORKSHIRE AND LANCASHIRE.

There are a few gas coal inquiries on the market for deliveries to commence in three or four months' time, but as yet there appears to be no sign of a general price for that commodity. The position is dominated by the stock at each supplying colliery.

The industrial market, especially in the better grades of washed fuels, has been slightly firmer, and recent quotations show advances in washed doubles and singles, possibly due to fixtures at the end of last year. Efforts have been made to stabilize this; but the result is problematical. Now that the holidays are over there will be an opportunity during the next few weeks of analyzing any degree of advancement among the larger coal consuming industries.

The export section is a little better; but not much tonnage is involved.

The demand for domestic coal continues steady, and although recent business has been more satisfactory, it is possible still to execute orders on the day of receipt.

The following are the Humber bunker and export prices, f.o.b. usual shipping ports: South Yorkshire—Hards, Association, 16s. to 16s. 3d.; screened gas coal, 16s. to 17s.; washed trebles, 16s. 6d. to 17s.; washed doubles, 15s. 9d. to 16s.; washed singles, 15s. 3d. to 15s. 9d.; washed smalls, 12s. to 12s. 3d.; and smithy peas, 17s. to 18s. 3d. per ton. West Yorkshire—Hartley's (f.o.b. Goole), 14s. 6d. to 15s. 6d.; screened gas coal, 14s. 6d. to 15s. 6d.; washed trebles, 16s. 6d. to 17s.; washed doubles, 15s. 6d. to 16s.; washed singles, 15s. to 15s. 6d.; washed smalls, 12s. to 12s. 3d.; unwashed trebles, 15s. 3d. to 15s. 9d.; unwashed doubles, 12s. to 13s.; rough slack, 10s. to 10s. 6d.; coking smalls, 10s. to 10s. 6d. per ton. Derbyshire and Nottinghamshire—Top hards, 16s. 3d. to 17s. 3d.; washed doubles, 15s. 9d. to 16s.; washed singles, 15s. 3d. to 15s. 9d.; washed smalls, 11s. 6d. to 12s.; rough slack, 9s. 9d. to 10s. per ton. Yorkshire, Derbyshire, and Nottinghamshire—Screened steam coal, 14s. 6d. to 15s. 6d.; gas coke, 24s. to 25s. 6d.; furnace coke, 17s. 9d. to 18s. 3d. per ton.

In Lancashire, engine fuel has been difficult to sell, the trade in domestic fuel is slower, and stocks are large. Quotations are: Lancashire best house, 31s. to 32s.; seconds, 28s. to 29s.; common, 19s. to 21s.; kitchen, 22s. to 24s.; Yorkshire selected house, 31s. to 34s.; best house, 26s. to 28s.; cobbles, 18s. to 19s.; washed doubles, 12s. 6d. to 14s.; washed singles, 11s. 6d. to 12s. 6d.; rough slack, 7s. to 9s. per ton in wagons at the pits.

MIDLANDS.

There is no new stir in the trade so far as markets are concerned, though internally the fresh alignment which is considered inevitable continues to be canvassed. With regard to the proposed subsidizing of exports from the coalfields of the East Midlands, those collieries that cater only for the home markets await more light as to the benefits that will accrue to them if they give their support to the scheme. Subject to effective steps being taken to relieve them of the encroachments of exporters in the home market, it may be said of many of them that they could not object to pay the levy. But if they pay the premium, they naturally want to make sure of the policy.

Most of the sporadic advances which were announced by collieries during the severe weather of the Christmas season have had to be withdrawn. The house coal trade has relapsed into lethargy again, with supply and not demand regulating prices. There is no measurable improvement in the industrial consumption. At the quarterly meeting at Birmingham last week contracting was limited, business being more generally on hand-to-mouth lines.

The events of the past month have produced a better balance between supply and demand. With forced sales no longer demoralizing the market, the ground gained in regard to slacks and smalls is being held. Good nutty slacks fetch 7s. to 8s. and D.S. nuts 10s. to 11s.

TRADE NOTES.

Messrs. George Wilson Gas Meters, Ltd.

The firm have removed their Manchester Works to: Radium Works, 11, Radium Street, Oldham Road, Manchester; and the London Works to: "Certus Works," No. 579, Kingston Road, Raynes Park, S.W. 20.

Glasgow Gas Plant Contracts.

The Ritchie-Atlas Engineering Company, Glasgow, have received a contract from the Glasgow Corporation for the design, manufacture, and erection of telpher extension, ash hoppers and coke handling and screening plant to the value of £15,000. This is in addition to a similar contract for coke handling plant for the Dawsholm Gas-Works, received a few weeks ago.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Jan.* 16.

Business in pitch is quiet, and the price is nominal.

Creosote maintains its firm tone, and is steady at not below 9d. per gallon net and naked.

Tar spirits are unchanged; pure benzole being 1s. 5d. to 1s. 6d. per gallon, pure toluole about 1s. 10d. per gallon, 95/160 solvent naphtha 1s. 3d. per gallon, and pyridine about 6s. per gallon.

Tar Products in the Provinces.

Jan. 16.

There is little variation in the markets for tar products.

Pitch is quiet. There continues to be little or no demand from the Continent; while on this side producers appear to be well sold.

Creosote remains firm, and the demand continues.

Naphthalene is steady; but there still are sellers at under the prices at present asked by manufacturers.

In water-white products there is little doing.

Crude carbolic acid keeps very firm indeed. Crystals carbolic remains quiet without alteration in price. Cresylic acid is still firm.

The average prices of gas-works products during the week were: Gas-works tar, 59s. to 64s. Pitch—East Coast, 80s. to 82s. 6d. f.o.b. West Coast: Manchester, 75s. to 77s. 6d.; Liverpool, 77s. 6d. to 80s.; Clyde, 78s. to 81s. 6d. Benzole, 90 p.ct., North, 1s. 1d. to 1s. 2d.; crude, 65 p.ct. at 120° C., 10d. to 10½d., naked at makers' works; 50/90 p.ct., naked, North, 1s. 3d. to 1s. 4d. Toluole, naked, North, 1s. 4d. to 1s. 5d. nominal. Coal-tar crude naphtha, in bulk, North, 7½d. to 8d. Solvent naphtha, naked, North, 9½d. to 10d. Heavy naphtha, North, 10d. to 1s. Creosote, in bulk, North, liquid, 7½d. to 7⅝d.; salty, 7⅜d. to 7½d.; Scotland, 7½d. to 7⅝d. Heavy oils, in bulk, North, 8¾d. to 9¼d. Carbolic acid, 60 p.ct., 2s. 4d. to 2s. 5d. prompt. Naphthalene, £13 to £15; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

Reduction in Price at Otley.—The Otley Gas Company have reduced the price of gas by 1d. per therm, bringing the charge for domestic uses to 10½d. per therm.

"Safety First" Posters.—We have received from the National Employers' Mutual General Insurance Association, Ltd., examples of their "safety first" posters for use in works. There can be no doubt that constructive safety posters make men more thoughtful. They arouse imagination, and warn men of the tragic folly of chance-taking.

Gas and Health.—A gas exhibition held in the Mechanics' Institute, Bradford, and promoted by the Bradford Corporation, was opened on Dec. 9 by the Lord Mayor (Alderman M. Conway). He said it was certain that the supersession of coal fires by gas fires would help to clean up the city generally, and contribute to the public health. The more general use of gas cookers in London had brought about a revolution in the cleanliness of the atmosphere; and he hoped that a similar change would follow in Bradford.

British Industries Fair, Birmingham.—The extensions of the exhibition buildings for this year's British Industries Fair (Birmingham and Midland Section) at Castle Bromwich are approaching completion. The Fair will be 30 p.ct. larger than that of last year. The long wooden corridor which formerly connected Exhibition Halls A and B has disappeared, and a fine new structure, 640 ft. long and 190 ft. wide, has been built on the old site and on land on either side. Structural changes have been made, so that the several halls become, in effect, one building under one roof; there being nothing to disturb the view from one side of the main entrance to the extreme end of Exhibition Hall C, a third of a mile away. The schedule is similar to that of last year; but for the first time there will be an organized and concentrated exhibit of the gas industry of the country in the new hall.

The Bedworth Gas and Coke Company have given notice to the Foleshill Rural District Council that they intend to apply to the Board of Trade for an Order empowering them to increase the maximum price of gas to 6s. 6d. per 1000 c.ft.

The high price of gas at Swansea, compared with Cardiff, Newport, and other towns in South Wales, was the subject of discussion at the Swansea Chamber of Trade recently. It was decided to appoint a Committee to form a deputation to the Gas Company to endeavour to discover the reason.

Due to the cold weather during the week prior to Christmas, previous record outputs of gas from the Smethwick undertaking were surpassed. At a recent meeting of the Town Council, the Mayor (Alderman A. Morris) congratulated the Gas Committee on the splendid manner in which they had coped with the emergency.

The Dartmouth Town Council have recently decided to ask the Dartmouth Gas Company and the Electricity Company to tender for street lighting for ten years. The General Purposes Committee of the Council had reported the receipt of a letter from the Gas Company stating that the Company were prepared to quote for the street lighting on the same conditions as 1922, upon the understanding that if their contract was less by £30 per annum than the contract price submitted by the Electricity Company, and the quotation was not accepted by the Corporation, then they should be paid the sum of £25 for the cost of preparing the tender. The Council decided that the Gas Company be not paid £25 for preparing a tender.

STOCK MARKET REPORT.

On the Stock Exchange last week business gradually quieted down, and in fact towards the close became distinctly unsettled. In the Industrial Market there were two disturbing influences. The first was the publication of the British Celanese circular regarding the Company's patents, followed by the prompt challenge from the Non-Inflammable Film Company, and the second the revival of the Tobacco War bogey. Whatever the ultimate outcome of these alarms, there is no doubt they had an adverse and far-reaching effect on share prices last week.

The stocks that showed most promise were Foreign Government and Rails, the demand for which was well sustained. Gilt-edged securities were affected by the new big 4½ p.ct. India loan announcement, the notices of which were published at the week end. The price of the issue (91¼) shows a running yield of £4 18s., and with redemption a full 5 p.ct. The result of the issue will be awaited with interest, the immediate effect being that existing India loans were marked down.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Jan. 18.	Rise or Fall on Week.	Transactions Lowest and Highest Prices.
£			% p.a.	% p.a.				
171,978	Stk.	Sept. 8	5	5	Aldershot 5 p.c. max. C.	68—78		
229,992	,,	,,	4	4	Do. 4 p.c. Pref.	69—72	..	70½
1,561,868	,,	Sept. 29	7	7	Alliance & Dublin Ord.	93—97	..	71½
574,000	,,	Jan. 12	4	4	Do. 4 p.c. Deb.	64—67*	+3	94½—95½
532,654	,,	Aug. 25	—	7	Barnet Ord. 7 p.c.	105—108	..	—
300,000	1	Oct. 13	1/7½	1/7½	Bombay, Ltd.	21/6—23/6	..	106½—107½
170,000	10	Aug. 25	8½	8½	Bournemouth 5 p.c.	12½—13½	..	22/6
775,000	10	,,	7	7	Do. B 7 p.c.	12—12½	..	..
80,000	Stk.	Jan. 12	6	6	Do. Pref. 6 p.c.	10½—11½	..	..
162,035	,,	,,	8	8	Do. 5 p.c. Deb.	55—58*	..	..
357,900	,,	Aug. 25	4	4	Do. 4 p.c. Deb.	74—77*	..	55½—58½
941,800	,,	,,	—	7½	Brighton & Hove 6 p.c. Con.	103—111	−1	..
1,327,500	,,	July 28	6/8/6⅔	6/8/6⅔	Do. 5 p.c. Con.	98—101	..	..
855,000	,,	Sept 29	5	5	Bristol 5 p.c. max.	87½—88½a	..	..
100,000	,,	Dec. 22	7	8	British Ord.	110—113	+½	..
120,000	,,	,,	7	7	Do. 7 p.c. Pref.	114—117	..	112—113
200,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	72—75	..	..
180,000	10	Nov. 24	—	33/2	Do. 5 p.c. Red. Deb.	93—96	..	..
100,000	10	Oct 27	8	6	Cape Town, Ltd.	7—8	..	..
150,000	Stk.	Dec. 22	4½	4½	Do. 4½ p.c. Pref.	6—7	..	..
236,860	,,	July 28	4½	4½	Do. 4½ p.c. Deb.	72—77	..	..
287,980	,,	Jan. 12	6	6	Cardiff Con. Ord.	100—103	+2	75
157,150	,,	Aug. 11	7½	7½	Do. 7½ p.c. Red. Deb.	101—104*	−2	99½
72,185	1	Oct. 13	5	5	Chester 5 p.c. Ord.	87—93b	..	..
24,496	1	,,	½/-	½/-	Colombo Ltd. Ord.	31/—33/-	..	..
221,490	1	Oct. 13	1/4½	1/4½	Do. 7 p.c. Pref.	90/—92/-	..	..
178,900	1	,,	1/9½	1/9½	Colonial Gas Assn. Ld. Ord.	24/—26/-	..	..
2,073,280	Stk.	July 14	1/7½	1/7½	Do. 8 p.c. Pref.	20/—22/-	..	25/-
475,000	,,	Dec. 22	—	5	Commercial Ord.	93—95	..	21/8
800,000	,,	Sept. 29	8	8	Do 8 p.c. Deb.	55—58	..	94—95
200,000	,,	,,	‡1	11	Continental Union, Ltd.	28—33	..	57—58
787,580	,,	Aug. 11	7	7	Do. 7 p.c. Pref.	87—92	..	..
408,100	,,	,,	6½	6½	Croydon sliding scale	98—101	..	..
492,270	,,	Aug. 25	5	5	Do. max. div.	81—84	..	100½—101½
55,000	,,	Dec. 22	9	6	Derby Con.	103—105e	..	83—84½
909,000	,,	Aug. 25	4	4	Do. Deb.	71—73e	..	..
50,000	,,	Dec. 22	5	5	East Hull Ord. 5 p.c.	78—81	..	..
1,002,180	10	Sept. 29	5	5	Eastbourne 5 p.c. Deb.	90—95	..	..
5,747,450	Stk.	July 28	‡8	‡4	European, Ltd.	7½—8	..	..
1,800,000	,,	,,	5	5	Gas Light & Coke 4 p.c. Ord.	93—95	−½	71—72⅞
4,187,020	,,	,,	8½	8½	Do. 8½ p.c. max.	62½—64½	−½	93—94¾
5,802,630	,,	Dec. 22	8	4	Do. 4 p.c. Con. Pref.	76—79	+½	62⅜—64
181,815	,,	,,	6	8	Do. 8 p.c. Con. Deb.	59—61	..	77½—79
1,642,770	,,	,,	5	6	Do. 6 p.c. Br'tf'd Rd. Db.	101—104	+1	103½—103½
42,000	,,	—	7½	5	Do. 5 p.c. Red. Deb.	98—100	..	99—100
82,500	,,	Aug. 25	6⅔	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
958,740	,,	,,	5½	6⅔	Hastings & St L. 5 p.c. Conv	89—92	..	..
70,000	10	Oct. 18	†10	5½	Do. 3½ p.c. Conv.	70—73	..	..
173,200	Stk.	Aug. 25	5	†10	Hongkong & China, Ltd.	12—13	..	..
1,978,008	,,	Nov. 10	10	5	Hornsey Con. 3½ p.c.	75—78	..	..
223,130	,,	Aug. 11	8½	10	Imperial Continental Cap.	144—147	..	..
326,242	,,	Aug. 11	6½	8½	Do. 3½ p.c. Red. Deb.	68—70	..	141½—146½
2,145,907	,,	Aug. 11	5½	7	Lea Bridge 5 p.c. Ord.	88—89b	..	..
600,000	,,	Sept 29	7	6½	Liverpool 5 p.c. Ord.	96—99	..	..
165,736	,,	Aug. 25	8	7	Do. 7 p.c. Red. Pref.	103—105b	..	..
75,000	5	Dec. 22	†7	9	Maidstone 5 p.c. Cap.	107—112	..	..
641,920	Stk.	Nov. 24	†7	18	Malta & Mediterranean	5½—5¾	..	..
2,061,315	,,	July 28	5	‡5	Montevideo, Ltd.	91—93	..	..
860,929	,,	,,	4	5	Newcastle & Gateshead Con.	79½—79¾d	+½	..
691,706	,,	June 29	8½	4	Do. 4 p.c. Pref.	67½—6-½d	..	..
181,785	,,	Aug 25	—	8½	Do. 8½ p.c. Deb.	66½—67½d	..	..
900,000	,,	Nov. 24	7	6/18/0	North Middlesex 6 p.c. Con.	98—96	..	..
188,120	,,	Dec. 22	7⅜	9	Oriental, Ltd.	103—113	..	..
414,500	,,	Aug. 25	7½	7⅜	Plym'th & Ston'house 5 p.c.	102—107	..	105½
286,732	,,	,,	5	7½	Portsm'th Con. Stk. 4 p.c. Std.	102—105	..	..
1,389,909	1	—	—	5	Do. 5 p.c. max.	76—79	..	..
382,200	100	Dec. 1	4	—	Primitiva Ord.	20/6—21/6	..	20/9—21/3
600,000	Stk.	July 28	4	4	Do. 4 p.c. Red. Deb.	90—93	..	..
484,968	,,	Dec. 22	4	4	Do. 4 p.c. Red. Deb. 1911	76—77	..	..
180,000	10	Sept. 29	6	4	Do. 4 p.c. Cons. Deb.	74—76	..	..
135,000	50	Jan. 3	5	6	San Paulo 6 p.c. Pref.	81—83	..	..
270,000	Stk.	Sept. 8	5½	5	Do. 5 p.c. Red. Deb.	46—48	..	..
419,968	,,	,,	5½	5½	Sheffield A	102—104e	..	..
1,047,000	,,	,,	5½	5½	Do. B	102—104e	..	..
80,000	10	May 26	4	5½	Do. C	102—104e	..	..
6,809,948	Stk.	Aug. 11	7	6	South African	4—6	..	4
500,000	,,	—	—	5	South Met. Ord.	103—105	..	103—104½
1,895,448	,,	Jan. 12	8	—	Do. 6 p.c. Irred. Pf.	110—113	..	..
734,000	,,	Sept. 8	6½	8	Do. 3 p.c. Deb.	59—62*	..	61
91,600	,,	Aug. 11	6½	6½	Do. 6½ p.c. Red. Db.	102—104	..	..
1,343,795	,,	July 28	6½	6½	South Shields Con.	101—103d	..	..
868,877	,,	Dec. 22	6½	6½	South Suburban Ord. 5 p.c.	109—105	..	104
647,140	,,	Sept. 8	5	5	Do. 5 p.c. Deb.	92—95	..	..
191,275	,,	Dec. 22	4	5	South'mpton Ord. 5 p.c. max	78—81	+2	..
360,000	,,	Aug. 25	7	4	Do. 4 p.c. Deb.	72—75	..	..
120,000	,,	Dec. 22	6½	7	Swansea 7 p.c. Red. Pref.	108—106	..	104½
883,475	,,	July 28	7½	6½	Do. 6½ p.c. Red. Deb.	99—102	..	..
180,000	,,	,,	6½	7½	Tottenham District A 5 p.c.	107—110	..	107
181,255	,,	,,	5½	6½	Do. B 3½ p.c.	91—94	..	..
238,201	,,	Dec. 8	4	5½	Do. 6½ p.c. Pref.	97—100	..	91½—98½
	,,	Sept. 29	5	4	Do. 4 p.c. Deb.	74—77	..	..
239,054	,,	Aug 25	6½	5	Tynemouth Con. and New	81—83d	..	..
68,800	,,	,,	5	6½	Uxbridge, Maidenhead, & Wycombe 5 p.c.	85—90	..	..
				5	Do. 5 p.c. pref.	88—88	..	..
30,000	,,	July 14	8½		Wandsworth, Wimbledon, and Epsom—			
255,625	,,	,,	7	8½	Wandsworth A 5 p.c.	127—132	..	..
432,625	,,	,,	5/19/0	7	Do. B 3½ p.c.	107—112	..	..
382,000	,,	,,	6½	5/19/0	Do. C and New	94—99	..	..
98,000	,,	,,	7½	6½	Do. Wimbledon 5 p.c.	102—107	..	..
200,000	,,	,,	5	7½	Do. Epsom 5 p.c.	110—115	..	..
88,416	,,	,,	8	5	Do. 5 p.c. Pref	87—92	..	..
284,742	,,	Dec. 22	4	8	Do. 3 p.c. Deb.	56—59	..	..
	,,	,,		4	Do. 4 p.c. Deb.	73—76	..	..

Quotations at:—a.—Bristol. b.—Liverpool. c.—Nottingham. d.—Newcastle e.—Sheffield. * Ex. div. † Paid free of income-tax. ‡ For year.

In the Miscellaneous Market some excitement was caused by the co-operative movement in the Wireless and Cable sections, and Marconi debentures made an appreciable advance.

The Gas Market was extremely active, and the transactions recorded were above the average. There was a drop of ½ in Gas Light ordinary; but in view of the limitation of the dividend under the sliding-scale for the past half-year to not more than £5 18s. 4d. p.ct. per annum, this is not surprising. Some attention was given during the week to that Company's 3½ p.ct. maximum stock, which at 62½-64½ shows a higher yield than the ordinary stock. Alliance and Dublin rose 3 points to 93-97, and is still, on recent dividends, an attractive investment. Southampton 5 p.ct. maximum was also marked up 2 points, and Bristol 5 p.ct. maximum improved ½ point at the local exchange.

The following transactions were recorded during the week:

On Monday, Barnet 7 p.ct. maximum 106½, British 112, European 7⅞, 7⅞, 7⅞, Gas Light and Coke 94, 94⅜, 94¼, 94⅜, 94½, 94⅜, 3 p.ct. debenture 60, Oriental 108¼, Primitiva 20s. 10½d., 21s., 21s. 1½d., 21s. 3d., South Metropolitan 103¼, 103½, 104, Tuscan 20s. Supplementary prices, Sunderland 95.

On Tuesday, Aldershot 70½, Barnet 107½, Colonial 25s., 8 p.ct. preference 21s. 3d., Commercial 94½, 3 p.ct. debenture 57, Croydon 100½, 101¼, maximum dividend 83½, 84, European 7⅛, Gas Light and Coke 93⅞, 94, 94¼, 94½, 3½ p.ct. 62¾, 4 p.ct. preference 78, Imperial Continental 145¼, 145½, Newcastle 3½ p.ct. debenture 66, Primitiva 20s. 10½d., 20s. 11½d., South Metropolitan 103½, 103¾, Swansea 7 p.ct. preference 104¼, Tottenham "A" 107, "B" 91½.

On Wednesday, Aldershot 4 p.ct. preference 71½, British 112, Cape Town 4½ p.ct. debenture 75, Commercial 94½, 95, 3 p.ct. debenture 57, Croydon maximum dividend 84, European 7⅛, Gas Light and Coke 93½, 93⅞, 93⅞, 3½ p.ct. maximum 63¾, 4 p.ct. preference 78, Imperial Continental 146½, Primitiva 20s. 10½d., 21s. 1½d., 21s. 3d., South African 80s., South Metropolitan 103, 103¾, 3 p.ct. debenture 61, Swansea 7 p.ct. preference 104¾. Supplementary prices, Hong Kong 5 p.ct. debentures 86½.

On Thursday, Alliance and Dublin 94½, 95½, Bournemouth 3 p.ct. debenture 55½, 56½, *ex* div., British 113, Commercial 94, 3 p.ct. debenture 58, Gas Light and Coke 93, 93⅛, 93¼, 93½, 93⅞, 93⅞, 3½ p.ct. maximum 63, 4 p.ct. preference 77⅞, 79, 6 p.ct. Brentford debenture 103¼, 103½, 5 p.ct. debenture 99, Liverpool 7 p.ct. preference 102½, Primitiva 20s. 9d., 20s. 10½d., 21s. 1½d., 21s. 3d., South Metropolitan 103¾. Supplementary prices, Horley District Additional "B" 95, 95⅜, Liverpool 5 p.ct. 88½, 89, Southend new "B" 84½.

On Friday, Alliance and Dublin 94½, 95, 95½, Bombay 22s. 6d., British 112½, Cardiff 99⅞, Commercial 3 p.ct. debenture 57½, Croydon sliding-scale 100½, maximum dividend 83, 84½, European 7⅛, 7⅛, Gas Light and Coke 93, 93¾, 3½ p.ct. maximum 64, 4 p.ct. preference 79, 5 p.ct. debenture 100, Primitiva 20s. 9d., 20s. 10½d., 21s., 21s. 1½d., South Metropolitan 103, 103⅛, 104½, South Suburban 104, Tottenham "B" 93½. Supplementary prices, Southend new "B" 84½, 85.

In Lombard Street at the end of the week money was more plentiful than ever, and discount rates had a decidedly weak appearance. Large sums were available at 2½ p.ct., and old day-to-day loans were renewed at 3 p.ct. While Treasury Bills were allotted on lower terms—the average rate being £4 4s. 4·31d. p.ct., or 8½d. p.ct. below the previous week's rate—it was the first occasion since Oct. 7 that the whole amount offered was not allotted.

On the Foreign Exchange Market there was more activity in the American exchange, which closed with a further rise to 4·87¼. Swiss francs were weak, the Berne rate rising to 25·32½. Pesetas were offered from Amsterdam, and the Madrid rate rose to 28.63. Italian lire were higher at 92.25, but French francs were unaltered at 124.

Silver was sold on both China and India account, and the cash price fell to 26 5/16d. per oz. Gold remained at the nominal price of 84s. 11½d. per oz., a large quantity being available during the current week.

The Bank Rate is 4½ p.ct., to which it was reduced from 5 p.ct. on April 21. The Banks' deposit rate is 2½ p.ct., and the deposit rates of the discount houses are 2½ p.ct. at call and 2¾ p.ct. at notice.

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